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United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP VIII.

EDITED BY
FRANCIS A. WALKER,
CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1877.

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SYSTEM OF AWARDS

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

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Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respectively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP VIII.

JUDGES.

AMERICAN.	FOREIGN.
EDWARD ATKINSON, Boston, Mass.	ISAAC WATTS, Great Britain.
HUGH WADDELL, Savannah, Ga.	W. W. HULSE, C.E., Great Britain.
ED. RICHARDSON, Jackson, Miss.	ALVARO DE LA GANDARA, Spain.
A. D. LOCKWOOD, Providence, R. I.	A. GOLDY, Switzerland.
CHAS. H. WOLFF, Cincinnati, Ohio.	FRIEDRICH GUSTAV HERRMANN, Germany.
SAMUEL WEBBER, C.E., Manchester, N. H.	GIUSEPPE DASSI, Italy.
GEO. O. BAKER, Selma, Ala.	

GROUP VIII.

COTTON, LINEN, AND OTHER FABRICS, INCLUDING THE MATERIALS AND THE MACHINERY.

CLASS 228.—Woven fabrics of mineral origin.

Wire cloths, sieve cloth, wire screens, bolting cloths. Asbestos fibre, spun and woven, with the clothing manufactured from it. Glass thread, floss and fabrics.

CLASS 229.—Coarse fabrics, of grass, rattan, cocoanut, and bark.

Mattings—Chinese, Japanese, palm-leaf, grass, and rushes. Floor cloths of rattan and cocoanut fibre, aloe fibre, etc.

CLASS 665.—Cotton on the stem, in the boll, ginned, and baled.

CLASS 666.—Hemp, flax, jute, ramie, etc., in primitive forms and in all stages of preparation for spinning.

CLASS 230.—Cotton yarns and fabrics, bleached and unbleached.

Cotton sheeting and shirting, plain and twilled.

Cotton canvas and duck. Awnings, tents.

CLASS 231.—Dyed cotton fabrics, exclusive of prints and calicoes.

CLASS 232.—Cotton prints and calicoes, including handkerchiefs, scarfs, etc.

CLASS 233.—Linen and other vegetable fabrics, uncolored or dyed.

CLASS 234.—Floor oil cloths, and other painted and enameled tissues, and imitations of leather with a woven base.

CLASS 521.—Machines for the manufacture of cotton goods.

CLASS 523.—Machines for the manufacture of linen goods.

CLASS 524.—Machines for the manufacture of rope and twine, and other fibrous materials not elsewhere specified.

GENERAL REPORT

OF THE

JUDGES OF GROUP VIII.

PHILADELPHIA, October, 1876.

PROF. FRANCIS A. WALKER, *Chief of Bureau of Awards:*

SIR,—The Judges constituting Group VIII., of which I was the President, having completed their labors, I have the honor to submit to you the following report. They were charged with the examination of the exhibits in Classes 228, 229, 230, 231, 232, 233, 234, 521, 523, 524, 665, 666; and, for the more efficient performance of their onerous duties, the group was divided into sections, each consisting of three or more Judges, every section undertaking the examination of the exhibits in those classes with which its members were most familiar.

I have the honor to be, sir, your faithful and obedient servant,

ISAAC WATTS, *Chairman.*

GROUP VIII.

COTTON, LINEN, AND OTHER FABRICS.

CLASS 228.—Woven Fabrics of Mineral Origin.

This class comprised woven fabrics of mineral origin. The exhibits were numerous and excellent, though in some of them there appeared room for much improvement as regards ornamentation. The wire-cloths, sieve-cloths, wire-screens, and bolting-cloths were, as a whole, highly creditable, and deserving of commendation, on account both of the taste and economy displayed in their production. The garden ornaments were graceful, and well adapted to different varieties of climate. The wire fabrics for manufacturing purposes comprised several novel improvements. Among these may be mentioned the wire fire-proof lath, serving as a base for ordinary mortar plastering, or for asbestos covering, meeting, to some extent, a much-felt want for the purpose of rendering buildings thoroughly fire-proof. The asbestos fibre and fabrics deserve special mention, as, both on account of their variety and practical uses, they surpassed anything exhibited on previous occasions. For steam-packing, steam-joints, roofing, pipe-covering, and other purposes where excessive heat or fire has to be overcome, the material appeared to have been successfully utilized. Wood covered with asbestos, moistened with water or other liquid, and hardened by exposure to the atmosphere, seems able to defy the action of fire; while, from its properties of toughness, elasticity, and non-conduction of heat, as well as on account of its cheapness, it appears likely to be of great utility. As a covering for pipes used for the transmission of water or steam, its practical value will attract increasing attention; while, as a material for the production of non-combustible writing-paper, it may prove to be of considerable advantage where the preservation of private or public documents is important. This remarkable mineral product is found extensively distributed over the world, and is obtained in quantities from Italy, Germany, Switzerland, Canada, California, Pennsylvania, Maryland,

Carolina, Vermont, Maine, Virginia, Texas, and others of the United States.

CLASS 229.—Coarse Fabrics of Grass, Rattan, Cocoa-nut, and Bark.

The Exhibition was remarkably rich in these exhibits; and the display was in all respects most satisfactory. The various novel, economical, and useful articles of rattan deserve special notice, while the grasses and barks, in fibre and fabrics, evince considerable progress, and indicate the wonderful expansion in this direction which may yet be expected. In mattings,—Chinese, Japanese, palm-leaf, grass, and rushes; floor-cloths of rattan, cocoa-nut fibre, aloe, etc.,—it was satisfactory to observe the thorough blending of the artistic and the useful. There is, however, a vast field yet to be explored in the collection of the different varieties of these fibres, and in the employment of more of them in each fabric, as well as in the invention of machinery suitable for the purpose. This may be encouraged by the increased demand likely to arise for floor-cloth, mattings, etc., on sanitary grounds,—especially in the heated miasmatic regions of America and elsewhere.

CLASS 665.—Raw Cotton, Ginned, etc.

In this class there was scarcely any foreign competition, the cottons exhibited being almost entirely of American growth. Brazil, indeed, furnished, in small bales, some excellent specimens of the various descriptions produced in that empire, known as Pernambuco, Paraiba, Santos, Bahia, Maranham, and Maccio cotton. From India, two bales, of the usual size, of Dhollera, Hingunghût, Oomrawuttee, Broach, Dhawar, Bengal, and Madras cottons were exhibited, not for competition, but as an illustration of the mode in which the raw material is prepared and sent to market. From Egypt, and some other minor cotton-growing countries, small samples were furnished, which served to show their progress and capabilities; but nearly all the large commercial bales were from the Southern States of the Union. Some remarkably fine specimens of Sea Island cotton, grown in America, the Fiji Islands, Queensland, and elsewhere, excited much admiration. A quantity of cotton was drawn from the separate bales by expert samplers; and each lot, having a number attached to it, was examined, without the possibility of any one's knowing in what district or by what planter it had been grown, in order to secure a perfectly impartial decision. When the names of the successful competitors were disclosed, it was discovered that one of them was a colored planter.

This to myself was a source of special gratification, from the fact that I had for many years been engaged, in connection with the Cotton Supply Association of England, in promoting the cultivation of cotton in the colonies and dependencies of Great Britain and throughout the world, by free labor, at the time when the manufacturers of every country were almost entirely dependent upon slavery for the raw material which they required. I may also, perhaps, be permitted to state that I had the privilege of receiving, during the cotton famine in England, the first cotton (consisting of four bales) grown near Vicksburg by free colored labor in the then slave-holding States of the Union, and I could not but rejoice to meet the colored planter by the side of his white competitor, in amicable rivalry, and able to establish a claim to pre-eminence in this great branch of American industry.

CLASS 666.—Hemp, Flax, Jute, Ramie, etc.

Both in their primitive forms, and in the stages of preparation for spinning, the assortments were very complete, and the cultivated portions showed that considerable progress had been made in their improvement. This was especially observable in the different kinds of jute exhibited, of which there were several new varieties. The entire collection of these fibres was extremely interesting, and the careful examination of them justifies the conclusion that they are capable of much further application, and that they are likely to prove of great value and come into extensive use. Whether considered botanically or commercially they are deserving of attention, and may be made to answer a variety of important practical purposes. The rhea fibre, or China-grass, known by its Malay name of ramie,—the *Bœhmeria mica* of the botanist,—claims special attention, as likely to become a most valuable material for manufacturing purposes when the difficulties hitherto experienced in its preparation shall have been overcome. The information and samples obtained from China to aid the investigations of Dr. Falconer enabled him, and afterwards Sir William Hooker, to determine that rhea is the same plant as that from which Chinese grass-cloth is manufactured; and, in the London Exhibition of 1851, several specimens, in various stages of preparation, attracted attention and gave rise to subsequent experiments for utilizing the fibre. These experiments have served to demonstrate that its inherent qualities entitle it to take a high position among fibres, and that it is pre-eminent for its strength and lustre in comparison with others. It has been shown to be considerably stronger than either flax or hemp, and, while the fibres are as

fine as those of flax, if not finer, it has also the additional advantage of possessing, in a remarkable degree, a silky lustre. Jute, the only other fibre which can compete with it in this respect, is far inferior to it in strength and durability, as well as in its capability for bleaching and dyeing. It has been tried as a substitute for cotton, hemp, flax, wool, and silk. During the scarcity of cotton in England, cottonized rhea was spun, and the yarn woven into different fabrics, and dyed and printed. In some cases it was mixed with Egyptian, and in others with India cotton. The fabrics acquired a gloss which gave them the appearance of linen. Though the experiment was to a certain extent successful, the cost and other considerations precluded the possibility of its use as a substitute for cotton. It may, however, become a formidable rival to flax, in the finer varieties. It has also been successfully used as a substitute for longer-stapled wools; and, since the Exhibition of 1851, many attempts have been made, both in England and France, to test its suitability as a substitute for silk, or as an admixture with it, but in this respect it has a formidable rival in jute, on account of its greater cheapness. The superiority of rhea to hemp as regards strength and resistance to water may make it an advantageous substitute, and it may be possible to replace hempen cordage by lighter rhea ones. Should the prices of the raw material become reduced, and the means of its preparation be improved, rhea can scarcely fail to take a high place among fibres and to come into more extensive use. Indeed, there hardly exists a fibre which, on account of its own inherent properties, can be applied to so many different purposes. It is capable of entering largely into textile manufactures, and, as compared with flax,—which possesses the most extended range of applications, from the roughest canvas and cordage to the finest lace,—rhea has a range even greater still, owing partly to the superlative degree in which it is endowed with the qualities of fineness, strength, and lustre, seldom found in the same perfection in any single fibre, and partly to the singular position which it holds between the usual vegetable and the animal fibres. Although a vegetable fibre, its hairiness assimilates it to wool, and its gloss and fineness to silk. Thus it appears that rhea is capable of as wide a range of applications as hemp, to which it is superior in almost every respect, and as flax also, with the exception perhaps of its use for body linen, while it is capable of certain other uses for which only the animal fibres, wool and silk, have hitherto been employed. The cost of the raw material alone may be said to prevent its extensive introduction into manufactures. Any slight technical difficulties experienced in spinning and weaving which may remain

would speedily be overcome if the price were reduced so as to make its use remunerative. The cultivation of the rhea plant on a large scale has been encouraged by the British Government in India; and prizes of £5000 and £2000 each were offered for the production of machinery to facilitate its preparation for the market, in order to promote its more extensive use for manufacturing purposes. An extended cultivation of this valuable fibre in America will probably effect an increasing demand for its employment in manufactures.

CLASSES 230, 231, 232.—COTTON YARNS AND FABRICS.

These classes comprise exhibits which show in a striking manner the wonderful progress made by the cotton industry in the United States, and the remarkable degree of perfection which has already been attained, but they afford only scanty opportunities for comparison with the manufactures of other countries. The comparatively meagre collections sent by England and other European nations is chiefly attributable to the excessive protective tariffs which still find favor in America, and exclude foreign manufactures from her markets. Those who were thus precluded from the possibilities of trade found but little inducement to incur the trouble and expense of sending their goods to Philadelphia, and they therefore became conspicuous chiefly by their absence. On this account it was a subject of great regret, in which almost every European representative shared, that no complete comparison could be made, and that one of the most valuable purposes of an International Exhibition was thereby frustrated. But while American textile manufacturers had the field almost entirely to themselves, the small collections supplied by their foreign competitors were sufficient to show that they have nothing to fear whenever they can meet on equal terms, with a fair field and no favor. The general excellence and, in some cases, the superiority of the display made by England and her colonies was fully admitted, and the fabrics sent by the various manufacturing countries of the Continent of Europe were generally distinguished by qualities which placed them upon a par with the best productions of America. Indeed, the praises bestowed upon the few goods exhibited by foreign manufacturers made it a matter of regret that the number had not been largely increased. Canada made a remarkable display, —one which excited universal admiration, and which, as regards articles of clothing and textile fabrics of all kinds, was fully equal to any in the Exhibition. The American display of textile manufactures was extensive, varied, and important in every respect. The collection of fabrics produced in the numerous mills of the New England States,

New York, New Jersey, and other parts of the Union was as complete as it well could be, and afforded a striking proof of their capability to compete with the manufacturers of other countries, if it were not for the policy which, to a great extent, excludes them from the general markets of the world. The goods exhibited were, for the most part, pure, even, firm, and well manufactured. The dyed cotton fabrics were pre-eminent for brightness, coloring, and durability. The bleaching, dyeing, and finishing of the various grades and styles of cotton cloth evinced much superiority, which is probably, in some degree, attributable to the abundance of excellent water which exists throughout the States. The cotton prints and calicoes, and the colored and fancy goods exhibited both by American manufacturers and their foreign competitors were so nearly upon an equality that no one could lay claim to any marked degree of superiority. Some bleached shirtings from England attracted attention on account of their special fineness and even texture, combined with softness and purity, while the collective exhibits from the Gladbach district, Würtemberg, and Elberfeld, in Germany, were of pre-eminent excellence. The striking effects produced by the Jacquard loom are deserving of high commendation. The beauty of the designs and the embroidery in handkerchiefs, scarfs, etc., were deservedly much admired. The whole of these classes were conspicuous for exquisite workmanship, elegance of design, and harmonious blending of colors. On the part of every country much versatility of taste and skill was displayed. There was nothing gaudy, or that could offend the most fastidious or critical observer. The spirited and amicable contest for supremacy into which all nations more or less entered in the Centennial Exhibition, proves the remarkable progress which has been made in the course of the past century, and affords a powerful stimulus to further enterprise and exertion.

CLASS 233.—Linen and other Vegetable Fabrics.

The linen fabrics constituting this class were varied and extensive, and were remarkable for their superior fineness and quality. The Irish manufacturers may justly be said to have taken the lead; those of Scotland were but little behind, while Dresden, Würtemberg, Belgium, the Netherlands, Austria, Italy, Sweden, and Norway all presented a very creditable display. The American exhibitors in this class were not numerous, nor did they offer so great a variety as their foreign competitors. These fabrics were of general excellence and utility, and some were remarkable for the superior taste manifested in the coloring. Some of the printed lawns, brocades, and embroidered

linens displayed much novelty and elegance of design. The damasks of Dresden and the embroidered linens in the collective exhibit of Würtemberg were deserving of special mention. If pre-eminence may be claimed by the manufacturers of Ireland, it is only in such a degree as to extinguish envy and excite emulation. All the competing countries in this class are entitled to commendation, and may be congratulated on the progress already made, and the promise thus afforded of still further excellence.

CLASSES 234, 521, 523, 524.

On these classes the following statement has been furnished by Mr. William W. Hulse, a member of the group:

"The Chairman of Group VIII. has desired me to send a comparative report on the machinery, as an addendum to his own report. But, really, it is not practicable to form a judgment based on comparison, for lack of means, there being in no instance a complete set of textile machinery exhibited from any nation. The only exhibit which approached completeness was in the United States department, and it was not worked, but kept idle. If I might venture on giving some opinions which I formed, of an abstract character, I would say that, as regards extent of invention and ingenuity of detail, the United States were far ahead, for there was scarcely an exhibitor who had not some novel features to claim. For consummate invention and arrangement of mechanism—based, no doubt, on an older experience—the palm was, in my judgment, earned for Great Britain. I attributed the extent of ingenuity and invention manifested everywhere in the machinery department of the United States to the fostering, stimulating, and admirable patent-law system. As regards quality of construction, utility, and fitness for the purpose intended, I formed the opinion that the cotton-gin and the calico-printing machinery, and the machinery and tie-in warps from Yorkshire, were the most solid and best examples. The cotton-spool machinery of Conant; the calico dyeing machinery by Butterworth; spinning and weaving machinery by Draper, Lord, & Co., Kitson, Lyall, Thomas, Crompton, Knowles, and others; and the tentering machinery by Palmer,—all of the United States,—followed very closely upon the best examples from Great Britain.

"The other class upon which I had to form a judgment, in connection with my co-Judges in textile machinery, was that of oil-cloths. In this class I had no hesitation in assigning the first place to the United States, for great variety, beauty of design, richness of colors, and quality of texture in oil floor-cloths, table-cloths, car-

riage-cloths, and fancy cloths for upholstery; the best exhibit, in my opinion, being that of Messrs. Potter, Sons, & Co. For design and finish, durability of fabric and colors, and flexibility of oil floor-cloths of extraordinary size and area, the best example in the Exhibition (being fifteen yards long by eight yards wide, in one web) was exhibited by Messrs. Nairne & Co., of Scotland, Great Britain. In other floor-cloths, the Boulinikon, from England, and the American Linoleum floor-cloth were both excellent in quality, design, colors, durability, and strength, and for warmth to the feet were unsurpassed. It has been my misfortune, in making this report, not to have the assistance at hand of my excellent co-Judges, Messrs. Webber and Lockwood and Professor Hermann, of Germany, on machinery, and Messrs. Waddell and Baker on floor-cloths, etc. I should be very sorry if my opinion, thus expressed, should in any way differ from theirs; but, so far as I could gather at the time, I am inclined to think it does not."

AMERICAN COTTON AND COTTON MANUFACTURES.

BY EDWARD ATKINSON.

The report of the Chairman of Group VIII. gives a sufficient statement of the details of the results reached by the Judges of that group; but it may, perhaps, be well for the Secretary to make a more general report upon one of the principal subjects of which the Judges were called upon to take cognizance, to wit, the cotton production and cotton manufacture of the United States.

The commanding position of the United States in respect to the production of cotton has long been admitted; but it seems probable that even few of the manufacturers themselves have been fully aware of the strong position in which the cotton manufacture of the United States now stands in relation to other countries.

The subject of the production of cotton opens so wide a field that it is hard to know where to begin or end. There is no other product which has had so potent an influence upon the history and institutions of the land, and perhaps no other on which its future material welfare may more depend. When the Spaniards first entered Mexico, the natives were found to be clothed in cotton, and the art of weaving and dyeing had been carried to a high state of perfection for that time among them. Then, as now, the best and most prolific varieties of the cotton-plant existed there, and the plant is doubtless indigenous to Mexico.

In the United States, a century ago, it was scarcely known as an

important production, and not until the invention of the saw-gin by Eli Whitney, in 1792, did it become so. To-day the United States furnish nearly three-fourths the quantity consumed in their own limits, in Canada, and in Europe combined. There are no data by which the quantity produced and consumed elsewhere can be accurately determined. It may therefore be a matter of interest to state and record, in this report, the work that we have accomplished, and to forecast the work we may yet have to do.

Among the three fibres—wool, flax, and cotton—which constitute the principal materials for clothing, cotton is the most important; because it is ready for treatment by machinery as soon as it is gathered, because its conversion into cloth is least costly, and because its use for clothing is most conducive to health, in respect to the largest portion of the population of the world.

In the cotton-factories of Europe and the United States there are a little over sixty-eight million spindles, worked by about one million men, women, and children. In the operation of these spindles a little more than six million bales of cotton, of the average weight of American bales, are annually converted into ten thousand million yards of cloth, averaging one yard wide and four yards to the pound, or ten pounds to a piece of forty yards, or into the equivalent of such cloth in other fabrics. This quantity of cloth would furnish five hundred million persons twenty yards each, annually. Of the six million bales of cotton, the United States now furnish about four and a half millions in each year; and our proportion is, year by year, increasing. The last eight crops raised by the labor of freemen exceed the last eight crops raised, before our civil war, mainly by the labor of slaves, in the number of more than fifteen hundred thousand bales. If, then, it be a service to men to provide for them the largest quantity of the material that best serves their need for clothing, in this one respect our rank is assured. Then let us mark the extent to which we have yet trenched upon our resources. In this production less than two per cent. of the area of the cotton States is yet used. What we may yet accomplish may be better realized by considering the condition of a single State. We will select Texas, as being the State now making the most rapid progress in population, production, and wealth. Few persons can realize the facts in regard to this great State, except by comparison. In area it exceeds the German Empire by about sixty thousand square miles. It has the capacity to produce almost all the products of the temperate zone. It is underlaid with coal. But, in respect to cotton, on less than one-half of one per cent. of its area it last year produced one-half of all the cotton consumed in the United States; and four

per cent. of its area would be capable of producing all the cotton now consumed in Europe and the United States—over six million bales.

Under what conditions is this work now accomplished, or yet to be done? No longer by the forced labor of the slave upon the plantation, but by the labor of freemen, and mostly of freeholders on the farm. In most of the States where it is now grown cotton constitutes the salable or money crop of the farmer, who, in other respects, is becoming entirely independent as to his subsistence, raising food and meat to a greater extent than ever before. The Southern farmer still finds in cotton the means wherewith to furnish himself with money for other purchases. Cotton, therefore, being more and more the surplus crop or profit of the farmer, as distinguished from the planter, it becomes more difficult to determine its cost, its annual quantity until each year's crop has been delivered, or the prices at which its production will be checked. In answer to a very extended inquiry lately made by the writer, he has received estimates of the cost of production, ranging from six to fifteen cents per pound; the latter cost, however, having been given by one who, on twelve hundred acres of land, made only four bales of cotton the previous year. The general range of the estimates of cost were from six to ten cents. One answer to the question of cost was most significant. One said, "I have a nephew, twenty years of age, who, without the least detriment to his schooling, and working Saturdays, produced four bales of cotton." It may be asked, What did this lad's cotton cost to produce?

According to these returns, this Centennial year is also marked by greater improvements than ever before in the selection of seed, in the improvement of tools, in the use of fertilizers, and in the average crop per acre; positive evidence having been given of the production of two thousand five hundred pounds of lint or clean cotton on a single measured acre in Georgia. It was not claimed that this had been, or could be, profitable; but it is significant of the experiments that are being tried in many places. The average estimates of profitable work range from four hundred to one thousand pounds of lint, or clean cotton, per acre, according to the quality of the soil and the kind of work done.

The last ten years have also witnessed the conversion of the seed of the cotton-plant into many useful articles but little known before.

The future production of cotton in the United States, and the time within which our staple will take the place of all inferior grades is, therefore, only a question of numbers and intelligence. In respect to intelligence, it is not to be questioned that the planter of old time had far more skill than many of the farmers of the present time; but the

system of labor to which that skill was applied imposed conditions that could not be surmounted, and enforced the use of tools and methods unfit for the purpose. These methods may have assured prosperity to the few at the cost of the many; but it was the high price, and not the low price, of cotton, that limited the extension of the crop. Twenty years since, every bale that could be made by the force then upon the cotton-field was needed; and, under the steadily advancing price, the cost of opening new fields as steadily increased, until, in 1860, it cost fifty per cent. more to buy and stock a cotton plantation to raise the cotton for a given factory than it did to build the mill and fill it with machinery. All this has changed; and, in the five years last passed, more than a million persons have migrated to the fertile lands of Texas; and the independent freeholder will only be prevented from making more and more cotton each year by the low price, and not by the high price, it may bring. That no such check is very near may presently be made apparent.

In regard to the exhibit of raw cotton, the Exhibition was marked by a collection of commercial bales of every variety of cotton customarily sold in Europe, collected by Messrs. Claghorn, Herring, & Co., of Philadelphia, and said to have been the best collection ever made. It has been sold to the Dutch authorities, and is to constitute a part of an international exhibition of the products of the soil about to be opened in Amsterdam.

The exhibit of American cotton was limited in quantity, but was of the finest quality. Every bale was of the highest grade; but, as it appeared to be the desire of the contributors that the selection should be a very rigid one, it was made by rejecting one bale after another, until there remained but three, among which the Judges could make no discrimination, and for which they made three awards. When the key was opened that disclosed the name and status of the contributors, it was found, to the equal satisfaction of all the Judges, whether from the North or South or from abroad, that one of the diplomas had been gained by a freedman,—one whose farm, formerly known as the Joe Davis Plantation, in Mississippi, now proves that the production of cotton no longer depends on slavery for its abundance or its quality; while another was gained by a Vermont farmer who moved to Louisiana since the war ended.

In one respect, great improvement is needed where little has yet been made. The separation of the lint from the seed is the process that should be most fitly accomplished, but which is now most rudely done. The best saw-gin, of the usual construction, unless most carefully attended, tears, breaks, doubles, and otherwise injures the staple,

and but a small proportion of the cotton now made is delivered to the spinner in the best condition. Two new cotton-gins were exhibited at Philadelphia, which promise excellent results,—the roller-gin, made by Messrs. Platt Bros. & Co., of England, and the needle-point-gin made by the Messrs. Remington, of Ilion, New York. If these machines can be made to produce quantity in ratio to the quality of the staple which they deliver, their wide introduction cannot be long delayed.

The method of packing, covering, and handling cotton in the United States is now unfit in the extreme; and, as the competition becomes greater with declining prices, it is to be hoped and expected that better methods will be adopted. At present, it is alleged that it is not profitable to attempt better methods; but the time cannot be far distant when the bale of cotton will be as carefully prepared and protected as the bale of cotton fabrics.

In respect to the supply of cotton fabrics, this country fills as yet but a subordinate position, except as to its own inhabitants. Its relation to other countries will appear from the following table, taken mainly from the annual statement of 1875–76 of Messrs. Ellison & Co., of Liverpool:

Spindles per 1000 of Population.	Countries.	Spindles.	Cotton per Spindle.	Estimated Amount of Consumption.
218	United States	9,600,000	63 lbs.	600,000,000
1180	Great Britain	39,000,000	33½ "	1,297,000,000
135	France	5,000,000	42 "	
108	Germany	4,650,000	55 "	
31	Russia and Poland	2,500,000	60 "	
675	Switzerland	1,850,000	25 "	
103	Spain	1,750,000	46 "	
40	Austria	1,580,000	67 "	1,009,000,000
148	Belgium	800,000	50 "	
29	Italy	800,000	56 "	
48	Norway and Sweden	300,000	65 "	
57	Holland	230,000	60 "	
		68,060,000		2,906,000,000

Spindles, 68,060,000; pounds, 2,906,000,000: equal to a little more than six million bales of cotton of the average weight of American bales.

From this table it appears that the United States have a little more than fourteen per cent. of the spindles, and consume a little more than twenty per cent. of the cotton. About ninety-three per cent. of the production of the spindles of the United States is used at home, and about seven per cent. is now exported. On the other hand, only fifteen per cent. of the production of cotton fabrics of Great Britain is used at home, and eighty-five per cent. is exported. As to the other

countries named, it is probable that only two—Switzerland and Belgium—produce more cotton fabrics than they consume; the rest import more than they export.

It thus appears that the world is served to a far greater extent by Great Britain than by the United States in the matter of cotton manufactures. Yet, without trenching upon her proportion, the open field is yet vast. If we deduct the consumption of cotton fabrics of the people of the United States, the quantity of cotton consumed by the nations named in the table would furnish four hundred millions of people with twenty yards each of an average fabric thirty-six inches wide and four yards to the pound, or five pounds of the equivalent of such fabric in other varieties. It should be remembered that the clothing of the nations outside of Europe itself, which are thus supplied with five pounds, or twenty yards per head, mainly consists of cotton. How small this quantity is will appear by comparison with the use of cotton in the United States, where clothing mainly consists of other fabrics. Our consumption is of heavier fabrics, on the average; but, for the purpose of comparison, may be stated at twelve to thirteen pounds per head.

A further analysis will make it very clear that the demand for cotton fabrics may be almost indefinitely extended. For the purpose of this analysis, the case will be stated in round numbers, omitting small fractions.

The manufacture of cotton in the United States is equal to a little over thirteen pounds per head of the population, of which a little less than one pound is exported, leaving for home consumption twelve pounds *per capita.*

The cotton manufactures of Great Britain retained for home consumption, according to the annual statement compiled from the tables of the Board of Trade, are equal to only six pounds of cotton per head; but all the goods exported are much more loaded with sizing than those retained for home use. It is probable that a larger proportion of pure cotton is retained than is indicated by the tables.

The consumption of cotton in the countries on the Continent of Europe named in the preceding table is equal to about three and a quarter pounds per head, including the population of Russia, or four and one-third pounds per head, excluding Russia. But the Continent of Europe takes from Great Britain one-fourth part of all her exports, equal to one pound per head additional; making a consumption of about four and a quarter pounds per head, including Russia, or five and one-fourth pounds per head, excluding Russia.

The other three-fourths of the exports from Great Britain form, or

are substantially equal to, the whole supply of cotton goods, made by European machinery, now consumed in Asia, Africa, South America, Mexico, Central America, and Australia,—continents and countries said to contain from eight hundred millions to one billion population.

We have seen that the United States consume twelve pounds per head; Great Britain, six pounds per head, and probably more; Europe, exclusive of Russia, about five and one-fourth pounds per head; and these countries use cotton only as subsidiary to other fabrics, while the continents yet remaining to be considered use cotton more than any other fabric. What is their supply?

The consumption of cotton on the spindles of Great Britain is, in pounds		1,297,000,000
Less for home use	197,000,000	497,000,000
Less export to Continent of Europe, about . .	300,000,000	
Exported to other countries from Great Britain		800,000,000
Exported to other countries from United States		40,000,000

At the rate of five pounds per head, or twenty yards of light sheeting thirty-six inches wide, or fifteen yards of drilling at thirty inches wide, for the full dress of each person, supplied for one year, this quantity of cotton would furnish only one hundred and sixty-eight million people, or only seventeen per cent. of the population of the continents and countries named. On the average, the export of cotton fabrics from Europe and the United States to Asia, Africa, South and Central America, Mexico, and Australia is less than one pound of cotton per head of population. It follows that only one-fifth part of the population of these continents or countries is yet supplied with an average quantity of machine-made cotton fabrics required for a moderate annual consumption.

Cotton fabrics constitute the largest single item of the exports of Great Britain, and the increase of this export is no longer a question of the first cost of making the cloth. The fabric made upon modern machinery will inevitably displace the hand-spun and hand-woven fabric of Asia and Africa, if it can be placed alongside at a low cost for transportation. In this may we not find one of the lessons yet to be learned by us? May it not be our policy to promote the carrying of our goods to distant lands, by the repeal of all acts restricting navigation and the exemption of ships from local and national taxation?

The paramount advantage of Great Britain over the United States in the export of cotton fabrics may not be in the cost of manufacture, in rate of interest, in superior skill, or other advantage affecting the first cost. Our advantage in proximity to the cotton-field of the

South, the wheat-field of the West, and the pastures of the South-west, may more than counterbalance any disparity, if any exists, in these respects; but, in her vast merchant marine, unrestricted by statute, exempted from taxation, and promoted only by fair payments for service rendered in carrying mails, and in her thoroughly organized and permanent consular service, Great Britain possesses advantages over us which can never be surmounted except by adopting the same course which has given her this present supremacy.

Leaving to our competitors the share in the supply of the world's need of cotton goods which they have already secured, there yet remain, outside of Europe and the United States,—in Asia, Africa, and South America,—from four to eight hundred million people whose clothing consists mainly of cotton cloth. It must be spun and woven by the slow process of hand-work. Can we obtain our share in this unworked field? Four hundred million persons, at five pounds per head, would require from our Southern States four million additional bales of cotton, and would call for forty millions more cotton spindles in Europe or America to work them up. Who will raise this cotton, and where shall these spindles be constructed?

The empire of China is said to contain about four hundred million people, who are mainly clothed in cotton. The entire export of cotton cloth from England and the United States would supply only twenty-five to thirty millions with five pounds, or twenty yards each, if the whole supply was used for clothing. A large part of the American goods are used for the boat-sails and awnings of the immense river population, and not for clothing.

It thus appears that the cotton fabrics made upon the spindles of Europe and the United States have as yet been substituted for only a small portion of the hand-made goods of Asia and Africa, and have as yet served but a small proportion of the probable demand of South and Central America, the West Indies, and Australia.

That this demand will vastly increase with the low prices of cotton and the constantly decreasing cost of manufacturing, cannot be doubted. Hence the South has little need to fear the want of a market for all the cotton she can produce for many years to come,—nor can it be doubted that the North will contest with England the privilege of serving the increasing need of other nations. It may, therefore, be permitted the Secretary of Group VIII. to consider, from the American stand-point, the conditions under which we enter into friendly rivalry with Great Britain in this branch of industry. It is assumed that the principal seat of cotton-spinning in the United States will, for many years, remain in New England, because her

more dense population and the training of the people in the necessary arts assure it.

In respect to cotton, we are nearer the cotton-field, and therefore have an advantage over Great Britain. In regard to power, our water-power has doubtless been an advantage, but with the improvements in the use of steam that advantage may be disappearing. But in regard to the use of steam, the cost of fuel is steadily advancing in Europe and declining here. In the food of the operatives, we have the advantage. In the cost of iron, steel, and copper, we are at least even. In leather, lumber, oil, and starch, we have an advantage. On the whole, our advantages are such that, so far as the rates of wages affect the cost of production, we can afford to pay higher wages, and yet produce cotton cloth at a lower cost. The quality of our goods may not here be treated in comparison with those of other nations, but reference may be had to the report of the Chairman of Group VIII., Mr. Isaac Watts, of Manchester, England, upon that point. In only one respect has our principal competitor, England, a great advantage over us, and that is in her better system of raising the municipal revenues and in the absence of restrictions upon commerce,—machinery and ships being exempt from taxation.

Thus far we have treated the question in its larger elements. Let us now consider it in its least terms, and witness what marks the progress of the century just ended.

I have assumed a yard-wide fabric, of rather poor quality, as the unit of manufacture. It would not represent the average quality called for in our own land, but would be a fair example of the average fabric exported from Europe. If made honestly, and not loaded with other substances than cotton, its cost in this country or in Great Britain, with cotton at its present price of twelve and a half cents a pound, would be not far from six cents a square yard; and the margin between the good mill and the poor one, or between one country and another, would not exceed half a cent per square yard. Commerce now depends on the smallest fractions.

Cotton fabrics are gauged by the number of the yarn of which they are made, and the number means the number of skeins of eight hundred and forty yards each contained in one pound avoirdupois. We may omit all consideration of numbers of yarn coarser than No. 13, or finer than No. 40, as the greater part of the cotton manufacture of Europe and America lies within these limits. A yard of No. 13 yarn weighs six hundred and forty-one thousandths of a grain; of No. 40, two hundred and eight thousandths of a grain. The question of supremacy in the variety and cost of fabrics between Europe and

America, therefore, lies within the limit of less than half a grain on the yard of the yarn that must first be spun and then woven. As to the cost, the competition is chiefly confined to plain or twilled fabrics and printed goods. In the cost of manufacture, the competition on coarse goods is within the limit of half a cent a yard, and on fine goods within a cent or a cent and a quarter a yard; in printing common calicoes, within the limit of half a cent a yard. These small fractions represent the maximum of difference in the cost of labor and supplies in a well- or ill-managed mill, or between this country and Great Britain. It is not intended to admit that there is even so great, or any difference, only that these figures represent the greatest difference ever alleged. On the other hand, as we have said, a part, or the whole even, of the difference in cost of labor and supplies, if it exists, would be offset by our proximity to the cotton-field.

A marked feature in this branch of industry is in the few persons employed. In the United States the whole number of operatives in all the cotton-factories, bleacheries, and print-works does not exceed one hundred and fifty to two hundred thousand. A hundred years ago the slow and arduous labor of almost every woman was needed, in order to clothe her family, to be applied to the single spindle, now only seen upon the spinning-wheel that forms one of the curious ornaments of the parlors of those who are fond of old relics. This single spindle gave scanty material for the hand-loom, as slowly operated by some other member of the family or by a neighbor. Now, one woman clothes more than a thousand others, and in many ways lives herself more fitly and comfortably.

TEXTILE MACHINERY.

BY SAMUEL WEBBER.

It is somewhat difficult to make any report on the textile machinery of the Exhibition, applicable to flax and cotton, which shall attempt any international comparison, from the fact that Great Britain was the only country, except the United States, which made any attempt at an exhibition of such machinery, and her collection was so small and so different in character from the American exhibit that no comparison can be drawn.

Commencing with the British division, the first object of note was the roller-gin, for long-stapled cotton, as modified from the McCarthy patent by Messrs. Platt, of Oldham, and now adapted to the green-seed cotton, our common variety, which was a very well-built and

smoothly-working machine, doing a moderate amount of work, without injury to the staple.

The card, drawing-frame, and intermediate roving-frame of Messrs. Howard & Bullough, of Accrington, contained the only really new principle in this department, in the application of electricity to the "stop-motion," rendering it almost instantaneous, and of great value on the roving-frame, from the fact that "singles," technically so called, caused by the breaking of one of the rovings at the rollers, are almost entirely obviated.

The calico-printing machine and engravers' milling-machine, from Gadd, of Manchester, were beautiful specimens of strong, simple workmanship, well adapted to their intended purpose.

The warp-tying machine of Messrs. Greenwood & Batley, of Yorkshire, was very ingenious, but at the same time necessarily complicated; and it remains to be proved whether its economical advantages or practical utility are equal to the ingenuity displayed.

The exhibits of flax and jute machinery, from Messrs. Fairbairn & Co. and Lawson & Sons., of Leeds, were fair samples of staple English machinery, massive and strong, well adapted to their purpose, but possessing no particular novelty of invention.

The American department was more particularly marked by various novelties than the British, though sadly deficient as a whole in completeness, there being no complete set of cotton machinery exhibited, although many of the separate machines were there from different makers.

There were several gins for short-staple cotton, exhibited among the agricultural implements, all seeming to be well made, and capable of performing a large amount of work, and doing it well.

The cotton-opener of Kitson, of Lowell, Massachusetts, was a departure from the standard practice of late years, in the addition of a spiked cylinder or "rake," to tear open the hard mats of cotton from the bale before subjecting them to the blows of the beater, thus rendering the beater more effective in removing the seeds and dirt, and at the same time saving power, and preventing injury to the staple.

The underflat card of Messrs. Foss & Pevey, of Lowell, was another decided novelty, aiming to do the work of double carding on a single machine, thus saving half the floor space in the room, and one-third of the power used by the double system. The machine promises well, and is being thoroughly tried, practically, in some of the mills in Lowell and other places.

The system of cotton machinery (unfortunately not in operation) shown by the Saco (Maine) Water-Power Machine-Shop approached

more nearly to completeness than any other exhibit of the kind,—containing drawing-frame, slubber, intermediate, and fine roving-frames, and a self-acting mule of the "Parr-Curtis" pattern. For accuracy of workmanship, proportion of parts, excellence of finish, and practical utility it left nothing to be desired, and contained also various ingenious improvements. It may be considered, as a whole, the best exhibit of textile machinery from a mechanical point of view.

A set of roving-frames, slubber, intermediate, and fine, was also exhibited, in operation, by the Providence (Rhode Island) Machine Company, and fully maintained the reputation of its makers for ease and accuracy of operation, and economy of power at a high speed.

The combined "fly-frame" and "speeder" of Messrs. Mayer & Chatterton, built by Fales, Jenks, & Co., of Pawtucket, Rhode Island, was another noticeable exhibit, showing great ingenuity of combination, and possessing the most valuable points of the original machines from which it was derived.

Light and ingenious steel "speeder-flyers" of a new form, possessing great strength, as well as lightness, were exhibited by I. V. Smith, of Manchester, New Hampshire. These have given great satisfaction in mills where they have been tested.

Messrs. Eaton & Ayer, of Nashua, New Hampshire, exhibited a large variety of spools, bobbins, and shuttles, with several ingenious and useful improvements.

Messrs. George Draper & Sons, of Hopedale, Massachusetts, contributed their double-adjustable spinning-rings and loom-temples, from the Dutcher Temple Company; a ring spinning-frame, with the Sawyer spindle; a twister, with a spindle on the same principle; a spooler, with the "Wade" bobbin-holder; and a warper, with a combination of stop-motions. Their rings and temples are well known in the American cotton-mills, the Messrs. Draper having supplied nearly if not quite all the temples used in the United States for many years; and the Sawyer spindle, which recent trials have shown to be capable of producing more yarn in the same time than the ordinary form of ring-spindle, with a saving in addition of the power consumed, may be safely classed as an invention of great merit and utility. The Wade bobbin-holder is also coming rapidly into use, and giving entire satisfaction wherever introduced. The warper is being practically tested in various places. As a whole, the exhibit of the Messrs. Draper shows a great number of novelties of invention.

The Lewiston Machine-Shop, of Lewiston, Maine, exhibited a warper of excellent construction, thorough finish, and skillful arrangement, which is in use, and highly commended, in a large number of

the best mills in the United States. They also showed several looms of the Thomas patent, weaving a variety of fabrics, and a very superior loom making seamless bags. These machines may all be highly commended for adaptability to purpose and excellence of construction.

The looms of Crompton, Knowles, and Wood were all worthy of notice. The original and well-known Crompton loom has been modified and improved from time to time by successive inventions until it covers a wide range of figured or fancy-woven fabrics, and is a thoroughly well-built, trustworthy, and adaptable machine.

The Lyall Positive-Motion Loom is a comparatively new and decidedly valuable invention, of great scope and usefulness, as was shown by the two looms, side by side, one weaving wide-jute canvas for floor oil-cloths, and the other, with the application of the Jacquard harness motion, producing eight corsets at once, from as many continuous warps. Besides these, other looms of the same principle were weaving sheetings and seamless bags. Taken as a whole this collection was one of the remarkable features of the Exhibition.

Messrs. Butterworth, of Philadelphia, exhibited well-made and ingenious drying machinery for bleached, dyed, or printed fabrics.

Messrs. Palmer & Kendall, of Middletown, Connecticut, showed a drying and tentering machine for such fabrics as ginghams, muslins, mosquito-nettings, etc., which require to have the weft threads held firmly and squarely at right angles to the warp while being finished. This machine was very ingenious and well made, and is deserving of notice.

The twine- and thread-twisting-machines exhibited by Avery, of Worcester, Massachusetts, are also worthy of notice; the invention is an English one.

A very high rank in the scale of mechanical ingenuity must be accorded to the spool-winding and ticketing machines, both automatic, exhibited by the Willimantic Company. While the original conception of these machines is undoubtedly due to Hezekiah Conant, who does not appear as an exhibitor, the experiments were made and the machines perfected in the shops and at the expense of the Willimantic Company, who hold the patents, and they were properly exhibited by them. Duplicates of the same machines were shown in the British section, in the exhibit of Messrs. J. & P. Coats; but as it was clearly shown to the Judges that the machines were built in America, and had never been out of the country, they were precluded from taking any notice of them, although Mr. Conant, the originator of them, formerly in the employment of the Willimantic Company, is now connected with the Messrs. Coats, in the management of the Conant

Thread Company, at Pawtucket, Rhode Island, from which place the machines were sent. The Willimantic Company also exhibited a ring spinning-frame in operation on No. 160 yarn, at a speed of seven thousand five hundred revolutions of the spindle per minute. This frame was built by the Lowell Machine-Shop, and was filled, on one side, by spindles of the Sawyer patent, and on the other by a spindle which was a combination of the Sawyer and the Pearl. It has not been deemed practicable heretofore to spin such fine numbers on any machine but the mule. Specimens of their product in all its stages were exhibited; and the excellence of their thread is a sufficient comment on the perfection of their processes and machinery.

Another automatic spool-winding machine, which attracted much attention, was exhibited by the Clark Thread Company, of Newark, New Jersey, but it was an English invention, dating back some ten years.

The Messrs. Hope, of Providence, Rhode Island, exhibited pantograph engraving machines for calico-printers, of excellent construction. These machines are well known and in general use in the print-works in the United States.

This completes the list of the more noticeable machines exhibited. The rapid growth and great extension of the cotton manufacture in the United States, now employing nearly ten million spindles, combined with the high cost of manual labor, has caused a vast amount of ingenuity to be devoted to the construction of labor-saving machinery, and we regret that a more full exhibit of our cotton machinery was not made, and one or more complete systems shown in operation.

The same causes, combined with the former high prices of the metals used in construction, to a great extent, have led to the adoption of lighter forms of machines than are generally used in England, and the English Judges were at first disposed to find a want of strength in machines which the Americans have found to be amply sufficient for their purpose.

The improvements made in cotton-spinning in the United States were well illustrated by a comparison of the old water-twist frame, built by Samuel Slater, after Arkwright's original model, and exhibited by the Providence Machine Company, with the "Sawyer-spindle" ring frame, shown by the Messrs. Draper, or the Lowell Machine-Shop frame of the Willimantic Company.

LINENS.

BY SAMUEL WEBBER.

The cultivation and fabrication of flax are among the oldest industries of which we have any record; and the mummy-cloths of Egypt, and the various references to fine linen in the Hebrew Scriptures, bear evidence to the very great antiquity of this manufacture.

Nearly all the countries of Europe sent linens, in some form or another, to the Centennial Exhibition, while, owing to the national interest in and extensive use of cotton, the United States made but a very meagre display, and that partially manufactured from imported flax.

By far the largest and best proportion of the flax fabrics came from Great Britain, and the collection shown by Messrs. John S. Brown & Sons, of Belfast, Ireland, may be considered as, on the whole, the leading exhibit, consisting of table-linen, diapers, sheetings, shirtings, handkerchiefs, lawns, and yarns of great fineness and evenness, and of especial beauty of design and skill in weaving in the damask table-linen.

With a less full assortment, but of almost the same class, Messrs. Richardson, Sons, & Owden, of Belfast, presented equally beautiful table damask and fronting-linen, and handkerchiefs of great beauty and smoothness, as well as lawns and holland. In quality there was little choice between the two.

Messrs. Henry Matier & Co., of Belfast, exhibited embroidered handkerchiefs and cuffs and collars, which were greatly admired for the fineness of the fabric and the exquisite beauty of the embroidery, together with bleached and printed linens.

Robert McBride & Co., of Belfast, showed bleached and printed linen lawns and linen and cotton fabrics of great excellence. It would occupy too much space to call attention to the merits of every exhibitor in the British department. We can simply say that all were excellent. Messrs. Fenton, Connor, & Co., of Belfast; Dicksons, Ferguson, & Co., and the York Street Flax-Spinning Company, of the same place; and the Greenmount Spinning Company, all made large and superior exhibits.

Messrs. Dunbar, McMaster, & Co., of Gilford, Ireland; Marshall & Co., of Leeds; and Thomas Ainsworth, of Cleator, Cumberland, exhibited linen threads of well-known quality, among which the linen floss of Messrs. Dunbar, McMaster, & Co. was especially noticeable.

The Scotch manufacturers contributed a different class of goods,—

heavy and substantial fabrics, made of linen or jute, or both in combination, and suited to all the ordinary purposes of life, such as table- and bed-linens, crash, huckabacks, and other toweling; butcher's linen, floor- and stair-cloths, paddings, shoe-linings, drills, osnaburgs, ducks, buckram, horse-cloths, grain- and salt-sacks, burlaps, bagging, carpet yarns, etc. Among the exhibitors deserving mention were Messrs. James Normand & Co., of Dysart, Fifeshire; William Laird & Co., of Forfar; and the Cox Brothers and Frank Stewart Sandeman, of Dundee.

Crossing the British Channel to Belgium, we find the exhibit of Jacques de Brandt, of Alost, especially noticeable for the beauty of design and accuracy of execution in damask table-linen. Messrs. Van Damme Brothers, of Roulers, showed indigo-blue linen of excellent quality, for blouses and pantaloon stuffs for the working-classes. Rey, senior, of Brussels, contributed a very large and excellent variety of table-, bed-, and household-linen, of medium fineness, but superior quality. William Wilford, of Tamise, exhibited very superior canvas, and the Govaert Brothers, of Alost, also showed good canvas, and bags remarkable for quality and cheapness.

France was represented, in table-linen, by the house of Meunier & Co., of Paris, whose damasks were exquisite in design and workmanship; and in linen thread by Vrau & Co., of Lille, and Hassebroucq Brothers, of Comines, both exhibits being excellent for strength and evenness of fabric.

Holland sent a variety of substantial fabrics of flax for domestic use, all serviceable, but none especially noted for fineness or beauty of design. The exhibits of J. Eilas, of Strijp; Nieuwenhuizen and Van Stratum, of Geldrop; J. H. Terhorst, of Ryssen; and L. Planteijdt, of Krommenie, were all noticed as useful and serviceable fabrics.

Sweden was represented by G. Stenburg's Widow, of Jönköping, who exhibited damask table-linen of good quality and beauty of design.

Germany sent a fine collection in the combined exhibit of the flax-manufacturers of Würtemberg, of great variety and excellent quality; and Joseph Meyer, of Dresden, displayed damask table-linen of good design and fine finish.

Austria was admirably represented by the combined exhibit of Messrs. Regenhart, Raymann, and Kufferle, of Vienna, whose damask table-linen, with colored borders, showed surpassing excellence in design, combination of colors, and workmanship in the execution. Carl Siegl, of Vienna, exhibited a variety of staple linen goods of great evenness and beauty.

Norway sent excellent canvas and twines from the Christiania Sail-Cloth Manufactory.

Italy was represented by the table-damasks and other fabrics of the Remaggi Brothers, of Navacchio, Pisa.

Portugal sent a number of exhibits of flax fabrics of various kinds, among which I have noted the linen drills of Bahia & Genro, of Oporto; the bed- and table-linen of Antonio da Costa Guimaraes, of Guimaraes; and Manuel M. R. Guimaraes, and the National Sail-Cloth Company, of Lisbon.

Spain contributed table-damasks of excellent quality, manufactured by Jaime Sadó, of Barcelona; hand-spun bed-linen, by the Sons of Salvador Landa, Calatayud, Province of Saragossa; and a variety of flax fabrics from other exhibitors; also hemp shoe-thread, of good quality, from Marques, Caralt, & Co., of Barcelona.

Russia, as might be expected, excelled in this branch. Her most noticeable exhibit was that of Messrs. Hille & Dietrich, of Girardovo, in the Province of Warsaw, consisting of a great variety of fabrics,—colored damask table-linen of superior excellence in design and combination, fringed duck dessert- and library-cloths, bed- and fronting-linens, Turkish towels, ducks, and drills, etc., all of excellent and serviceable quality.

Baron Stieglitz, of Narva, exhibited very superior sail-cloth.

James Gribanoff's Sons, of Oostioog, Province of Vologda, showed a very fine display of linen yarns and cloths, table damask, fronting-linen, and handkerchiefs, all of great excellence and beauty.

Lange & Co., of Moscow, had excellent samples of woven hose for fire purposes, and very good yarns and cloths were sent by Alexandroff & Alofoozoff, of Kazan.

Compared with the foreign contributions, the display from the United States was but small, and is noted as follows. The Barbour Flax-Spinning Company, of Paterson, New Jersey, exhibited linen threads, which in strength, color, finish, and evenness compared favorably with the best English threads of Marshall. The American Linen Thread Company, of Mechanicsville, Saratoga County, New York, also made a fine display of threads and twines. The exhibit of woven goods was confined to the crash towelings of the Webster Linen-Mills, of Webster, Massachusetts, and the stair-drills, by the same company and by the Stark Mills, of Manchester, New Hampshire, who also exhibited coarse diaper with flax warp and cotton filling. All these articles were useful and excellent in their way, but bore no comparison, as evidence of skill and progress, with the linen fabrics of Europe.

The United States possess every variety of soil necessary for the growth of flax, and half a century since, before the enormous development of the cotton manufacture, it was a common article of cultivation in many parts of the country, and was spun and woven by hand into domestic fabrics in many households. Acres of flax are now cultivated for the seed in many of the States of the Union, but the ripened fibre which is thus obtained is too coarse and harsh for manufacturing purposes. Good flax-fibre was, however, shown at the Exhibition, from Canada, and we believe its cultivation for the purpose of manufacture, and its conversion into yarn and cloth, to be one of the possibilities of the future, and one which will amply repay attention and examination by thoughtful men. It does not seem that the amount of hand-labor required to fit the fibre for the machines, now so largely employed for spinning, need be so great as to form an insuperable obstacle.

FIBRES.

BY SAMUEL WEBBER.

The best-known and commonly-used fibres of vegetable origin, other than cotton, are those of flax and hemp, of which the proportion shown by the United States was very small. Fair specimens were exhibited from West Virginia, Oregon, and Kentucky; but, as was remarked in relation to flax fabrics, the growth of the cotton manufacture seems to have entirely overshadowed this industry. Canada, also, sent two exhibits of flax of fair quality.

Nearly all the exhibits of these fibres of any consequence were from Europe.

Austria sent flax from Moravia, of excellent quality, and hemp from Hungary.

Italy contributed the finest specimens of hemp, from Bologna.

Holland showed three very fine collections of flax. Portugal was represented by forty-nine exhibitors of flax and four of hemp; some of the flax was short in fibre, but of very fine quality.

Spain had twenty-five exhibitors of flax and twenty-two of hemp, covering a wide range of length and quality of staple.

Russia contributed thirteen collections of flax and three of hemp, all of excellent quality; and Belgium sent two very fine exhibits of flax, of exceeding fineness and beauty.

A feature of great interest, however, was the display, from various tropical and semi-tropical countries, of fibres little known to us, except by their products, but which seem capable, by the application of

suitable machinery, of becoming of immense value in the future, as subjects of manufacture.

The most noticeable of these was the Manila hemp, *Musa textilis*, from the Philippine Islands, which we usually see in the form of cordage, but which has a fibre capable, like those of flax and hemp, of extreme subdivision by proper treatment, being composed of a collection of finer fibres united by a glutinous matter, which is soluble in water, and admits of the reduction of the apparently coarse, long fibre exhibited (in some cases reaching twelve or thirteen feet in length) into a fibre sufficiently fine for delicate fabrics.

Samples of these fabrics were exhibited in the collection from the Philippine Islands, and were well worthy of attention.

In the same collection were also to be found numerous specimens of the "pina" cloth, and the fibres from which they were woven, as well as those of the banana, and other plants of the same genus. The fibres of the agave or yucca, from Mexico, were also very suggestive. Hammocks, nets, "grass-cloth" (so called), and paper of astonishing strength were exhibited by the local governments of Yucatan and Hidalgo, manufactured from this material; and its abundance in Mexico and Central America seems to make it a subject worthy the notice of manufacturers, if some ready means can be discovered of cleaning the fibre from the fleshy part of the leaf.

Besides these there were a vast number of less-known fibres exhibited, the "Phormium," or New Zealand flax, being the most familiar.

All the British colonies sent a greater or less variety of this and other fibres, the *Fourcroya gigantæa*, the ramie, the pita, the plantain, the banana, the pineapple, the wild fig, the aloe, the silk-grass, and the mahoe or hibiscus being among their contributions, forty-nine different varieties, including the above, being contributed from the Mauritius alone, and twenty-six from Queensland. Twenty different varieties were sent by Robert Prestoe, Esq., the Government botanist of Trinidad; eight from the Bahamas; and five from British Guiana.

Brazil also contributed several valuable fibres, the asclepias, urenas, palms (of different species), bilbergia, and fourcroya being the principal ones.

From Spain came a great variety of samples of the esparto grass, showing how largely it can be improved in quality by cultivation. This material is at present almost exclusively used for paper-stock, but was shown to be available for a great variety of purposes. Hats, baskets, and other articles were exhibited, which had been made of it, and if, as reported, it will grow in the sand where nothing else will,

it is worthy of attention. The Spanish-Portuguese Indian colonies, China, Japan, and Portuguese Africa also sent a variety of fibres, the ramie or China-grass being exhibited in fabrics in the Chinese and Japanese departments. Mats and matting from reeds, rushes, and other similar plants were shown by China, Japan, Spain, Portugal, and their colonies; and were deserving of praise for workmanship and ingenuity.

Those of us who can readily recall the whole history of the alpaca manufacture in Great Britain, and the adaptation of existing machinery, with slight modifications, to the purpose, by Sir Titus Salt, and who have also noted the enormous growth of the manufacture of jute in Scotland, in and about Dundee especially, can easily imagine that there is destined to be a great industry developed out of the manufacture of the Manila hemp, the sisal-grass, the ramie, and the American aloe; and, with this opinion, we can but think the display of the great variety of fibres at the Centennial Exhibition has been of great value in bringing them to the notice of practical men. There seems to be no more difficulty in applying existing machinery to these fibres than to alpaca or jute, if the fibres can be first freed from their woody or fleshy coverings; and that question does not seem to present any insuperable difficulty, though it may require time and patience to develop the most economical method.

REPORTS ON AWARDS.

GROUP VIII.

1. **Boott Cotton Mills, Lowell, Mass., U. S.**

COTTON FABRICS.

Report.—Commended for the excellence and even weaving of their cords and extra drills.

2. **Wamsutta Mills, New Bedford, Mass., U. S.**

COTTON FABRICS.

Report.—Commended for the uniformity, excellence, and purity of their well-known fabrics.

3. **Chicopee Manufacturing Co., Chicopee Falls, Mass., U. S.**

COTTON FABRICS.

Report.—Commended for extra fine and for extra heavy cotton flannel of very superior quality; also for the firm and uniform quality of their heavy $\frac{1}{4}^2$ sheeting, even and well made in every respect.

4. **Berkley Co., Providence, R. I., U. S.**

COTTON FABRICS.

Report.—Commended for the superior quality of lawns and nainsooks, and especially for fine sateens, No. 100 warp, 150 filling, 350 picks filling to the inch; the sateen being one of the finest, and supposed to be the very finest, fabric made in the United States. It deserves special mention for the great skill required in its production.

5. **Monadnock Mills, Claremont, N. H., U. S.**

COTTON FABRICS.

Report.—Commended for the excellent quality of the Marseilles quilts, and their adaptation to popular wants.

6. **Slater Cotton Co., Providence, R. I., U. S.**

COTTON FABRICS.

Report.—Commended for the very even quality of their bleached shirtings known as the "Pride of the West."

7. **Boston Manufacturing Co., Waltham, Mass., U. S.**

COTTON FABRICS.

Report.—Firm, strong, and thoroughly well manufactured medium fabrics, of special excellence.

8. **Great Falls Manufacturing Co., Great Falls, N. H., U. S.**

COTTON FABRICS.

Report.—A very full assortment of thoroughly well manufactured goods; well prepared and finished for service, both bleached and unbleached.

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9. **Lyman Mills, Holyoke, Mass., U. S.**

COTTON FABRICS.

Report.—Commended for excellence in the manufacture of Victoria lawns, twilled cambric, and cords.

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10. **The James Y. Smith Manufacturing Co., Providence, R. I., U. S.**

COTTON FABRICS.

Report.—Commended for evenness, purity, and good finish.

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11. **Tremont and Suffolk Mills, Lowell, Mass., U. S.**

COTTON FABRICS.

Report.—Commended especially for the flexibility and uniformity of their medium cotton flannel, and for serviceable sateen jeans.

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12. **Massachusetts Cotton Mill, Lowell, Mass., U. S.**

COTTON FABRIC.

Report.—Plain, serviceable standard and medium sheeting; round and well-spun yarn, evenly woven, especially fitted for common wear, at low cost.

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13. **Continental Mills, Lewiston, Me., U. S.**

COTTON FABRICS.

Report.—Commended for unusually firm, pure, and well-manufactured medium fabrics

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14. **Alabama and Georgia Manufacturing Co., West Point, Ga., U. S.**

COTTON FABRICS.

Report.—Commended for the great excellence and durable quality of their heavy standard sheetings.

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15. **Evansville Cotton Manufacturing Co., Crescent City Mills, Evansville, Ind., U. S.**

COTTON FABRICS.

Report.—Heavy sheetings made from good stock, even, well carded, and excellent in all respects.

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16. **Barker Mills, Auburn, Me., U. S.**

COTTON FABRICS.

Report.—Commended for the special evenness of yarn and excellence of weaving in their brown and bleached fabrics.

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17. **Hill Manufacturing Co., Lewiston, Me., U. S.**

COTTON FABRIC.

Report.—Commended for uniformity in the quality of their fabric.

18. **B. B. & R. Knight, Providence, R. I., U. S.**

COTTON FABRICS.

Report.—Commended for the full line of bleached cottons, excellent in all respects, in their several styles.

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19. **Langdon Manufacturing Co., Manchester, N. H., U. S.**

COTTON FABRICS.

Report.—Commended for the very superior quality and for the purity of finish of their fine and extra fine shirting.

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20. **Dwight Manufacturing Co., Chicopee, Mass., U. S.**

COTTON FABRICS.

Report.—A full exhibit of fine fabrics, bleached and unbleached, of special excellence in all respects.

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21. **Androscoggin Mills, Lewiston, Me., U. S.**

COTTON FABRICS.

Report.—Commended for the excellence of their seamless bags, the even, smooth texture of their wide sheetings of the higher grade, and for the general uniformity of their fabrics.

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22. **Cabot Manufacturing Co., Brunswick, Me., U. S.**

COTTON FABRICS.

Report.—A uniform quality of bleached goods, well made for service and durability.

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23. **Bates Manufacturing Co., Lewiston, Me., U. S.**

COTTON FABRICS.

Report.—Commended for the general excellence in the style and design of their Marseilles and crochet quilts, and of their fancy woven white goods.

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24. **Stark Mills, Manchester, N. H., U. S.**

COTTON FABRICS.

Report.—Commended for very even spinning and weaving in their heavy standard sheetings, and for the very superior quality of their seamless bags.

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25. **Ponemah Mills, Taftville, Conn., U. S.**

COTTON FABRICS.

Report.—Commended for the excellence of their extra fine printing cloths.

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26. **Pocahontas Manufacturing Co., Putnam, Conn., U. S.**

COTTON FABRICS.

Report.—Brown and bleached cottons, of medium grade, made and finished for durability.

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27. **Naumkeag Steam Cotton Co., Salem, Mass., U. S.**

COTTON FABRICS.

Report.—Commended for excellence and uniform quality of their plain and twilled wide sheetings, $\frac{10}{4}$ and $\frac{11}{4}$ wide.

28. **Nashua Co., Nashua, N. H., U. S.**

COTTON FABRICS.

Report.—Commended for bleached and unbleached cotton fabrics, of medium grades and excellent quality in all respects.

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29. **Davol Mills, Fall River, Mass., U. S.**

COTTON FABRICS.

Report.—Commended for the superior quality of their serge twilled lining fabric, fine honeycomb cloaking, sateens, and striped piqué.

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30. **Walcott & Campbell, New York Mills, Oneida Co., N. Y., U. S.**

COTTON FABRICS.

Report.—Fine bleached cottons, firm, uniform, well bleached and finished; of very superior quality.

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31. **Millville Manufacturing Co., Philadelphia, Pa., U. S.**

SPECIAL COTTON FABRICS.

Report.—Commended for excellent Tillott cloth; also for tracing muslin, superior in quality and water-proof, to be used with ink or pencil.

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32. **Hassan Ali, Yiemen, Arabia Petrea.**

COTTON FABRICS.

Report.—Commended for the excellence in fabric and color, and adaptability to purpose, of the striped tent curtains.

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33. **Batllo Brothers, Barcelona, Spain.**

COTTON FABRICS.

Report.—A large and excellent display of bleached cotton fabrics, adapted to ordinary use, and of economical manufacture.

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34. **The Government of Turkey, Constantinople, Turkey.**

COTTON FABRICS.

Report.—Commended for the large and varied collection of cotton fabrics, illustrative of the costumes of the country, and displaying skill in coloring and ingenuity in weaving, as well as adaptability to the wants of the people.

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35. **Oglou Ohanes Mourouk, Brousse, Turkey.**

COTTON FABRICS.

Report.—Commended for the excellent quality and economical production of the Turkish bath towels.

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36. **T. & D. Wilson & Co., Glasgow, Scotland.**

COTTON FABRICS.

Report.—Commended for the great variety and excellent quality of the cotton fabrics, notably the Swiss mulls, Victoria lawns, and other goods of that class, as well as for the beauty and excellence of the curtain stuffs.

37. Anjos Cunha Ferreira & Co., Lisbon, Portugal.

COTTON FABRICS.

Report.—Commended for very excellent display and variety of colored cotton goods, suitable for the laboring classes, especially their cotton handkerchiefs.

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38. Augusto Frederico Etur, Lisbon, Portugal.

COTTON FABRICS.

Report.—Commended for economy and adaptability to purpose in their cotton handkerchiefs and prints.

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39. Zimin Brothers, Zooieva, Moscow, Russia.

COTTON FABRICS.

Report.—Commended for excellence in quality, and economy in price, of dyed Turkey red cottons, used by the common people.

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40. Mariano Regordosa & Co., Barcelona, Spain.

COTTON FABRICS.

Report.—Commended for the evenness of fabric and excellence of color of the Adrianople red yarns.

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41. Oliver & Fonrodona, Mataro, Barcelona, Spain.

COTTON FABRICS.

Report.—Commended for the excellence and adaptability to purpose of the cotton sail duck.

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42. La Obrera Mataronense, Mataro, Barcelona, Spain.

COTTON FABRICS.

Report.—Commended for economy and adaptation to purpose of the heavy cotton fabrics exhibited, as well as excellence in quality.

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43. José Puig & Co., Barcelona, Spain.

COTTON FABRICS.

Report.—Commended for the excellent quality and great variety of the bleached cotton fabrics exhibited, with the trade-mark "La Fortuna."

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44. Geronimo Roiz de la Parra, La Cavada, Province of Santander, Spain.

COTTON FABRICS.

Report.—Bleached cotton fabrics of even, pure, and very substantial quality, well spun and woven.

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45. John Garelin, Ivanovo-Vosnesensk, Wladimir, Russia.

COTTON FABRICS.

Report.—Commended for economy in cost and adaptability to popular wants of the plain and printed cottons.

46. **John Koushin, Serpookhov, Moscow, Russia.**

COTTON FABRICS.

Report.—Commended for especial excellence in the exhibit of cotton, in every state of progress, from the bale, to cloth of great evenness, firmness, and beauty.

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47. **Cotton Spinning Mill of Balsa, Vallongo, Portugal.**

COTTON FABRICS.

Report.—Commended for the general good quality of the fabrics.

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48. **Lisbon Spinning and Weaving Co., Lisbon, Portugal.**

COTTON FABRICS.

Report.—Commended for great variety, general excellence, and adaptability to the wants of the people.

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49. **Xabregas Cotton Manufacturing Co., Lisbon, Portugal.**

COTTON FABRICS.

Report.—Commended for excellence in colored cambrics and bleached and brown cotton yarns.

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50. **C. M. Raffin's Widow & Son, Paris, France.**

COTTON FABRICS.

Report.—Commended for the excellent quality, both in fabric and color, of the tarlatans and muslins exhibited.

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51. **Gujer Brunner, Uster, Zurich, Switzerland.**

COTTON FABRICS.

Report.—Commended for excellence and economy in their exhibit of white and colored cotton bed and table furniture.

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52. **Nydalens Company, Christiania, Norway.**

COTTON FABRICS.

Report.—A large and excellent display of plain and colored cotton fabrics.

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53. **Wauregan Mills, Wauregan, Conn., U. S.**

COTTON FABRICS.

Report.—Commended for the special merit of their fabrics, known as the "Wauregan 100s."

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54. **José Tolrá & Co., Barcelona, Spain.**

MADAPOLLAM AND OTHER FINE COTTON FABRICS.

Report.—Commended for fineness of texture, good quality, and good finish.

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55. **Manuel Alvares Montes, Oporto, Portugal.**

COTTON FABRICS.

Report.—Commended for variety, durability, and excellence of cotton fabrics.

56. **Government Cotton Factory, Sakai, Setzu, Japan.**

COTTON AND COTTON FABRICS.

Report.—Commended for the completeness and excellence of the exhibit of cotton, raw and in various states of progress of manufacture.

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57. **J. T. Berg, Nääs, Floda, Sweden.**

COTTON YARNS.

Report.—Commended for the evenness of the cotton yarns and the excellence of the samples of cotton in its various states of preparation for yarn, and also for the excellence and variety of the colors in which the yarn is dyed.

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58. **Morse, Kaley, & Co., Milford, N. H., U. S.**

KNITTING COTTON.

Report.—Commended for the excellence and adaptability to purpose of their white and colored knitting cotton.

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59. **Doña Juana Reyes, Province of Batangas, Philippine Islands.**

COTTON YARNS.

Report.—Commended for the excellence and adaptability of the cotton yarn.

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60. **Shaffner & Stringfellow, Philadelphia, Pa., U. S.**

KNITTING COTTON.

Report.—Commended for remarkably fine qualities in all respects. Very full assortment of colors. In all respects an admirable exhibit.

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61. **Hadley Company, Holyoke, Mass., U. S.**

COTTON YARNS AND TWINES.

Report.—An excellent display of warp yarns, shoe threads, and seine and harness twines; all of great evenness and perfection.

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62. **J. U. Schlæpfer, Waldstadt, Switzerland.**

MULLS AND NAINSOOKS.

Report.—Commended for the very even weaving of their hand-made and power-loom goods, especially in the fine yarns, varying from No. 80 to No. 240, and from 75 to 160 inches wide. Power-looms are used for goods as fine as No. 160 yarn. Mulls and nainsooks are most excellent in quality.

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63. **Whittenton Manufacturing Co., Taunton, Mass., U. S.**

COTTONADES AND DRESS GOODS.

Report.—Commended for superior excellence in quality and design; good combination of colors in great variety. Twilled mixed cottonades, especially well colored and harmonized. Fancy cotton cassimeres, patterns choice in design, fabric of great strength and general good quality. Dress goods, colors and styles well designed.

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64. **Wortendyke Manufacturing Co., Wortendyke, N. J., U. S.**

COTTON LAMP WICKING.

Report.—Commended for the good quality and softness of their products.

65. **Manville Co., Providence, R. I., U. S.**

BLEACHED COTTON FABRICS AND COLORED JACONETS.

Report.—Commended for the peculiar excellence of their fine bleached shirtings, and for the superior smoothness of fabric, strength and fineness of texture, and excellence and variety of their jaconets.

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66. **Wm. Wood & Co., Philadelphia, Pa., U. S.**

COTTONADES AND COTTON CASSIMERES.

Report.—Commended for excellence in styles, comprising a very large assortment; imitation of fine woolen cassimeres, very good; superior fabric, durability, and economy.

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67. **Lowell Bleachery, Lowell, Mass., U. S.**

COTTON GOODS, AS EXAMPLES OF BLEACHING AND DYEING.

Report.—Commended for purity and whiteness, especially of the long cloth finish.

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68. **Crestuma Spinning Co., Feira, Aveiro, Portugal.**

COTTON YARNS.

Report.—Even, smooth, good spinning thread.

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69. **Whitfield Manufacturing Co., Corinth, Miss., U. S.**

COTTON YARNS.

Report.—Cotton yarn of excellent quality, produced directly from the seed cotton without the use of the ordinary gin, by an equivalent apparatus attached to the card.

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70. **Thomar Royal Spinning Co., Thomar, Portugal.**

COTTON PRODUCT.

Report.—Brown, bleached, and dyed cotton yarns of good quality and at reasonable price.

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71. **Neilson, Storer, & Sons, Johnstone, near Paisley, Scotland.**

KNITTING AND EMBROIDERY COTTON YARN.

Report.—Commended for the peculiar softness, flexibility, evenness, fitness for their intended purposes.

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72. **John Hawkins & Sons, Manchester, England.**

BLEACHED SHIRTINGS.

Report.—Commended for the especial fineness, even texture, and excellent bleach of their highest grades of goods, combined with softness and purity.

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73. **Salvador, Pages, & Co., Barcelona, Spain.**

BLEACHED COTTON GOODS.

Report.—Commended for the very substantial quality, pure finish, and very even yarn from which they are woven.

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74. **Assetto di Graziani Brothers, Chieri, Turin, Italy.**

COTTON QUILTS AND BLANKETS.

Report.—Commended for even quality in the weaving and for excellent taste in the designing.

75. Mechanical Weaving Co., Linden, near Hanover, Germany.

COTTON VELVETS AND VELVETEENS.

Report.—This is one of the most artistic exhibits in the Exposition; texture and finish superb; variety and blending of colors excellent; elegant, durable, exquisitely tasteful. The colors and fabric blend so harmoniously, and are so exceedingly well done, as to give the appearance and finish of silk velvet. The new black in various shades is full of light and lustre. A complete triumph, in both finish and color.

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76. Volarte Brothers & Conill, Barcelona, Spain.

PIQUE CLOTHS, TUFTED.

Report.—Commended for excellence and variety of designs and patterns; superior workmanship and tufting; general excellence.

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77. Josef Parma, Tichau, Moravia, Austria.

MARSEILLES TUFTED COTTON FABRICS.

Report.—Commended for excellence in material; manufacture of choice patterns; remarkably good work in tufting; great variety of patterns.

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78. Emile Idiers, Anderghem, near Brussels, Belgium.

DYED COTTON YARNS.

Report.—Commended for depth, durability, variety, and delicacy in coloring, with the best quality of material in all respects.

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79. Ferguson Brothers, Holme Head Works, near Carlisle, England.

DYED SILESIAS, SATEENS.

Report.—Commended for fineness of texture, superior colors, superb dyeing, with a finish of remarkable excellence. The harmony and blending of colors are exceedingly fine, also in great variety.

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80. Anjos & Co., Lisbon, Portugal.

DYED COTTON FABRICS.

Report.—Commended for general excellence of indigo-blue dyed cotton fabrics, with peculiar adaptability to the wants of the masses.

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81. A. Baertsoen & Buysse, Ghent, Belgium.

DYED VELVETEEN OF COTTON FABRICS.

Report.—Commended for durability and general excellence, richness in finish, and harmony of colors.

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82. W. Swinkels, Helmond, Netherlands.

DYED COTTON YARNS.

Report.—A very fine assortment of high colors; the dyeing of wonderful brilliancy and evident durability.

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83. Azmoos Weaving Mills, Azmoos, St. Gallen, Switzerland.

WOVEN COLORED COTTON FABRICS.

Report.—Commended for novelty in design, with great and harmonious variety of colors, excellence in smoothness of texture and durability.

84. **Jaumandren & Co., Barcelona, Spain.**

PRINTED COTTON FABRICS.

Report.—Commended for excellent quality and great variety of samples of printed calicoes, adapted to ordinary use, showing great skill and ample resources for production.

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85. **A. Chiffray, Narbonne, near Rouen, France.**

FURNITURE HANGINGS.

Report.—Commended for the beauty of design, excellence of combination of colors, and adaptability to purpose, of the cotton and linen hangings and curtains.

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86. **Nicholas Polooshin, Ivanovo-Vosnesensk, Wladimir, Russia.**

PRINTED COTTON FABRICS.

Report.—Commended for superior excellence in coloring, and neatness of design and execution, in madder and steam colors, on cambrics and fancy woven cotton goods.

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87. **W. Menshikoff & Sons, Ivanovo-Vosnesensk, Wladimir, Russia.**

PRINTED COTTON FABRICS.

Report.—Commended for economy and adaptability of printed cotton fabrics, for popular use.

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88. **A. Gros & Co., Bruchsal, Germany.**

COLORED COTTON VELVETS.

Report.—These goods are low-priced, and for the lower grades exhibit good workmanship and remarkable variety in bright colors.

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89. **Carl Kauffmann, Reutlingen, Germany.**

COLORED WOVEN QUILTS.

Report.—Commended for excellence in design, weaving, colors, economy.

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90. **Paul Lopatin, Ivanovo-Vosnesensk, Wladimir, Russia.**

PRINTED COTTONS.

Report.—Commended for excellence in design and execution of printed calicoes in light colors and combinations, and also beauty of design and skill in coloring of furniture prints.

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91. **Catherine Koovajef, Dimir, Russia.**

PRINTED COTTONS.

Report.—Commended for excellence in madder pink "frock plates."

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92. **Lisbon Cotton Dyeing and Printing Co., Lisbon, Portugal.**

PRINTED COTTON FABRICS.

Report.—A large and well-executed assortment of printed calicoes and furniture chintzes.

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93. **Alexis Possylin, Ivanovo-Vosnesensk, Wladimir, Russia.**

PRINTED COTTON FABRICS.

Report.—Commended for the excellence in design, colors, and printing, as well as the economy of production, of the printed cotton handkerchiefs for the use of the peasants.

94. **Millville Manufacturing Co., Philadelphia, Pa., U. S.**

SILESIAS, WINDOW HOLLANDS, AND UMBRELLA CLOTHS.

Report.—Specialty: fine colors, fabrics of good finish.

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95. **Social Manufacturing Co., Providence, R. I., U. S.**

SILESIAS.

Report.—Commended for the variety of colors as being very remarkable; also for the evenness of the fabrics; admirable in both respects.

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96. **Bass, Abrate, & Co., Turin, Italy.**

COTTON COUNTERPANES AND BLANKETS.

Report.—Commended for excellence in design and fabrics, and adaptability to purpose.

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97. **Malmö Cotton Manufacturing Co., Malmö, Sweden.**

COLORED COTTON FABRICS.

Report.—Strong fabrics for common uses; durable and economical; excellent coloring for common goods.

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98. **Alessio Brothers, Milan, Italy.**

COLORED COTTON YARNS.

Report.—Commended for evenness and excellence in color and smoothness of thread in the Turkey red cotton yarns.

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99. **Bernardo Meda, Monza, Milan, Italy.**

COLORED COTTON YARNS.

Report.—Commended for the excellence in color of the Turkey red yarns.

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100. **I. V. Gentiluomi & Co., Pisa, Italy.**

COLORED COTTON FABRICS.

Report.—Commended for excellence and adaptability, in fabric, design, color, and variety, of colored cotton fabrics.

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101. **Collective Exhibit of the Circuit of M. Gladbach, Germany.**

COTTON AND MIXED GOODS.

Report.—Commended for great variety of fabrics, excellence of design; well made throughout; durable, economical; altogether a thoroughly well assorted exhibit.

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102. **George Stratford, Jersey City, N. J., U. S.**

OAKUM.

Report.—Commended for excellent quality and softness of texture.

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103. **Balhão Cotton Printing Factory, Oporto, Portugal.**

PRINTED COTTONS.

Report.—Commended for general adaptability to purpose, at a reasonable price, of the indigo-blue fabrics.

104. **Ricart & Co., Barcelona, Spain.**

PRINTED COTTON FABRICS.

Report.—Commended for great variety and excellence in design, color, and execution, in printed cambrics and calicoes, fitted for general use.

105. **José Ferrer & Co., Barcelona, Spain.**

PRINTED COTTON FABRICS.

Report.—Commended for great variety and excellence in design and color, and economy of production in printed calicoes.

106. **Juan Achon, Barcelona, Spain.**

PRINTED COTTON FABRICS.

Report.—Commended for beauty of design, excellence in color and execution in printed cotton fabrics for furniture covers and curtains.

107. **Joaquin Casas & Jover, Barcelona, Spain.**

PRINTED COTTON FABRICS.

Report.—Commended for excellence in cloth and printing, neatness in design, and superiority in color, in black and indigo-blue printed calicoes.

108. **C. T. Stork & Co., Hengeloo, Netherlands.**

MADRAS GINGHAMS AND MADRAS HANDKERCHIEFS.

Report.—Especially well made for general use; good material throughout, in fabric and coloring matter; economically made, and will be economical in service.

109. **Eduardo Borras, Barcelona, Spain.**

PRINTED COTTON FABRICS.

Report.—Commended from consideration of economy in the low price, great variety, and general adaptability of the printed cotton handkerchiefs.

110. **Henri Fierz, Zurich, Switzerland.**

PRINTED COTTON FABRICS.

Report.—Commended for beauty of design, and excellence in coloring and execution, of Adrianople red printing in cambrics, handkerchiefs, shawls, and chintzes.

111. **Wallenstadt Fancy Cotton Goods Mills, Wallenstadt, Switzerland.**

WOVEN COLORED GINGHAMS AND HANDKERCHIEFS.

Report.—Commended for peculiar and excellent combination of colors, strong but fine fabric, great variety, durability of colors and fabric, novelty in method of dyeing, and excellence of colors and dyeing.

112. **Salis Schwâbe & Co., Manchester, England.**

PRINTED COTTON FABRICS.

Report.—Commended for variety and elegance in design, coloring, and engraving in printed cotton fabrics for dresses and furniture chintzes, and madder colors of great excellence and beauty.

113. **Roeffs & Co., Siegfeld, Germany.**

PRINTED COTTON HANDKERCHIEFS.

Report.—Commended for great variety and good execution, taste in design, and brilliancy in colors, as well as for novelty in style, in printed handkerchiefs.

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114. **N. Garelin & Sons, Ivanovo-Vosnesensk, Wladimir, Russia.**

PLAIN AND PRINTED COTTON FABRICS.

Report.—An admirable exhibit of cotton in all forms, from the staple as grown in the Caucasus, through all its various processes of manufacture, into remarkably level yarns, smooth and firm cloth, and dyed and printed fabrics of great excellence in color, design, and execution.

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115. **Pacific Mills, Lawrence, Mass., U. S.**

PRINTED CALICOES, LAWNS, AND PERCALES.

Report.—Commended for taste and variety in design, clear colors, and sharp printing; especial excellence in lawns and percales.

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116. **David S. Brown & Co., for the Gloucester Manufacturing Co. and the Ancona Printing Co., Philadelphia, Pa., U. S.**

PRINTED COTTON FABRICS.

Report.—To the Gloucester Manufacturing Co. for excellence in design, colors, and execution in mourning prints, shepherds' plaids, and shirtings. To the Ancona Printing Co. for variety and excellence, especially in light chintzes, striped percales in high colors, handkerchiefs, flags, oil black and lavender prints and aniline black calicoes, with figures in steam colors, and also for polonaise suitings.

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117. **McCrossan & Farr, New York, N. Y., U. S.**

COTTON HANDKERCHIEFS.

Report.—Commended for style, finish, color, and quality.

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118. **Merrimac Manufacturing Co., Lowell, Mass., U. S.**

PRINTED COTTON FABRICS.

Report.—Commended for especial and superior excellence and novelty in "cardinal reds," for beauty and excellence in design and coloring in printed furniture cretonnes, and for excellence in madder purples and shirting stripes.

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119. **Wood & Haslam, Philadelphia, Pa., U. S.**

DYED COTTON YARNS AND FABRICS.

Report.—Commended for excellence in color and design in Turkey red yarns and table cloths.

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120. **American Print Works, Fall River, Mass., U. S.**

PRINTED COTTON FABRICS.

Report.—Commended for great variety and excellence in design and execution in wide percales in light styles, imitation seersuckers, ginghams, and shirting stripes, as well as in regular madder styles.

121. **Hamilton Woolen Co., Southbridge, Mass., U. S.**

PRINTED COTTON FABRICS.

Report.—Commended for novelties in design and neatness of execution, good coloring, good printing of their "Knickerbocker" percales and cambrics.

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122. **Andreas Hartell & Co., Pennypack Print Works, Philadelphia, Pa., U. S.**

PRINTED CALICOES AND SHIRTINGS.

Report.—Commended for excellence in "imitation oil colors" in reds and greens, and prints in imitation of German ginghams and dress goods.

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123. **Manchester Mills, Manchester, N. H., U. S.**

PRINTED CALICOES.

Report.—Commended for variety and excellence in design and execution of madder prints, variety of styles, clearness of white and especial excellence in aniline black grounds, in imitation of woven effects, with bright figures in madder colors in pink and orange.

---

124. **Richmond Manufacturing Co., Providence, R. I., U. S.**

PRINTED COTTON FABRICS.

Report.—Commended for excellence in pink frockings, garancine pinks, and standard gray styles in calicoes.

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125. **Hamilton Manufacturing Co., Lowell, Mass., U. S.**

PRINTED CALICOES.

Report.—Commended for excellence in design, coloring, and execution, in chintz styles on wide cloth and in robes, and for aniline combinations with madder colors.

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126. **Pretty, Grime, & Co., Philadelphia, Pa., U. S.**

PRINTED AND DYED COTTON FABRICS.

Report.—Commended for excellence in dyed "solid blacks," in logwood and aniline, and neatness in design and clearness of execution in half-mourning prints.

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127. **S. H. Greene & Sons, Clyde Bleachery and Print Works, River Point, R. I., U. S.**

PRINTED COTTON FABRICS.

Report.—Commended for the excellence of their "Washington prints," in imitation oil colors, in ruby and green; excellent imitation of woven dress goods; delicate coloring in robes, and steam colors in flags, stripes, and handkerchiefs.

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128. **William Simpson & Sons, Philadelphia, Pa., U. S.**

PRINTED AND DYED COTTON FABRICS.

Report.—Commended for great variety, novelty, and excellence in design and execution in mourning and half-mourning prints, ultramarine blue, garancine chocolates and dyed calicoes, in solid black alpaca finish, and for regularity and evenness in fabrics.

129. Palmer & Kendall, Middletown, Conn., U. S.

COLORED MOSQUITO NETTINGS.

Report.—Commended for excellence of color and material, equality and proper size of meshes, straight edges, smooth finish, and flexibility.

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130. Mississippi Mills, Wesson, Miss., U. S.

COTTONADES, OSNABURG PLAIDS.

Report.—The material is excellent; coloring thoroughly well done; durability remarkable.

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131. Lewiston Mills, Lewiston, Me., U. S.

COLORED DUCK COTTONADES, TICKINGS, AND CHEVIOTS.

Report.—The colored ducks are excellent in styles and fabrics. The cotton cassimeres very flexible and durable. The four-quarter tickings are heavy, smooth, and of the best material. The cheviots are peculiar in delicate shadings, and well made.

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132. Shetucket Manufacturing Co., Norwich, Conn., U. S.

SHIRTING STRIPES.

Report.—Undressed, well made throughout, and of good color.

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133. Conestogo Steam Mills, F. Shroder & Co., Lancaster, Pa., U. S.

DYED CANTON FLANNELS AND GENUINE NANKEENS.

Report.—Commended for variety and beauty of colors, smooth, strong, and fine fabric, specialty in silky finish; durability.

Genuine nankeens, excellent in quality of cotton and fabric.

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134. Washington Mills, Lawrence, Mass., U. S.

COLORED CAMBRICS.

Report.—Commended for excellence, delicacy, variety of color, and smoothness of finish.

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135. I. Paĭ, St. Petersburg, Russia.

DYED AND PRINTED COTTON FABRICS.

Report.—Commended for excellence in design, combination, and colorings in light chintz cambrics, furniture prints, and handkerchiefs, and also in dyed plain cambrics and cotton pantaloon stuffs.

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136. Stephen Borissof & Sons, Ivanovo-Vosnesensk, Wladimir, Russia.

PRINTED COTTON FABRICS.

Report.—Commended for great excellence in design and combination of colors, and neatness of execution in chintz furniture and calicoes.

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137. Saladrigas & Brothers, Barcelona, Spain.

PRINTED COTTON FABRICS.

Report.—Commended for variety in design and excellence in finish, combined with economy of production, in printed cottons for general use.

138. La España Industrial, Barcelona, Spain.

PRINTED COTTON FABRICS.

Report.—Commended for excellence in design, colors, and fabric, in printed cretonnes for furniture purposes; variety and excellence in colors, in dyed cambrics and percales; good quality and variety, in common prints.

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139. Schlieper & Baum, Elberfeld, Germany.

PRINTED COTTON FABRICS.

Report.—Commended for great variety and beauty in design, excellence in colors and execution, not only in madder styles, but in a great variety of combination with aniline, catechu, artificial alizarine, ultramarine blue, and steam colors.

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140. I. Hanhart, Solivo Dietikon, Zurich, Switzerland.

PRINTED COTTON FABRICS.

Report.—Commended for superior excellence in Adrianople red, black, and orange chintzes.

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141. Jabez Johnson & Fildes, Manchester, England.

COLORED QUILTS AND MARSEILLES VESTINGS; TURKISH TOWELS.

Report.—Commended for excellence in coloring, exceedingly well defined, good designs; Marseilles vestings, thoroughly well woven and colored, fine material; Turkish towels and toweling excellent in every way. In all respects these three varieties are very superior.

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142. Simpson & King, Manchester, England.

PRINTED COTTON FABRICS.

Report.—Commended for very superior excellence in design and combinations of colors on cotton fabrics for household decoration, printed in imitation of needlework as shown by the Kensington School of Design; remarkable and novel in all respects.

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143. Renfrew Manufacturing Co., South Adams, Mass., U. S.

GINGHAMS AND SKIRTINGS.

Report.—Commended for assortment having harmony and fastness of colors, good styles and delicate shadings; chènè style especially good; ginghams of soft, smooth fabric, well colored and harmonized; fine ginghams, 80 × 72, well woven and smooth; twills, soft finish, fine assortment, of good colors and durable, black and white peculiarly, good in all respects.

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144. Bates Manufacturing Co., Lewiston, Me., U. S.

SATEENS, GINGHAMS, AND HONEYCOMB QUILTS.

Report.—Sateens; admirable assortment of colors and excellence of finish in all respects. Corded, fancy woven, and high colored fabrics. Commended for novelty and excellence in quality and fabric.

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145. Lancaster Mills, Clinton, Mass., U. S.

FANCY GINGHAMS.

Report.—Commended for superior excellence in quality; colors thoroughly harmonized and in great variety of very superior patterns.

146. Gloucester Gingham Mills, Gloucester City, N. J., U. S.

GINGHAM DRESS GOODS.

Report.—Commended for good quality and designs.

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147. Union Wadding Co., Providence, R. I., U. S.

COLORED COTTON WADDING AND BATTING.

Report.—Commended for excellent quality of material, well prepared, soft, and thoroughly glazed; large variety and evenness, with general adaptability to use.

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148. Silver Springs Dyeing and Bleaching Co., Providence, R. I., U. S.

PROCESS OF DYEING COTTON FABRICS.

Report.—Commended for dyeing and finishing; great variety of plain and varied colorings, silesias, jaconets, curtain hollands, beetled and silk imitations: the exhibit altogether is a triumph in its way; also for the excellence in bleaching and finishing white goods.

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149. Saratoga Victory Manufacturing Co., Victory Mills, N. Y., U. S.

BLACK AND COLORED SILESIAS.

Report.—Commended for evenness of fabric, smooth weaving and finish, good colors, delicacy in coloring; admirable throughout.

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150. Lonsdale Company, Lonsdale, R. I., U. S.

COLORED SATEENS.

Report.—Commended for remarkably fine quality, beauty of the silk finish, and superiority of coloring; the cloth being very superior and the fabric excellent in all respects.

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151. S. Thornton & Sons, Philadelphia, Pa., U. S.

COLORED COTTON GOODS.

Report.—Farmers' and miners' cotton checks. Commended for excellence of color and fabric; well designed in styles, and very durable.

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152. Putnam Manufacturing Co., Providence, R. I., U. S.

COLORED COTTON GOODS.

Report.—Colored curtain hollands a specialty; great variety and novelty of designs; colors remarkably good; blue mottled, new and admirable, fabric excellent.

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153. S. Meyer & Co., Bielefeld, Germany.

LINEN FABRICS.

Report.—Commended for great excellence and variety in the collection of linen shirt fronts, collars, and cuffs; and for adaptability and economy of fabrics.

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154. James Gribanof & Sons, Vologda, Russia.

LINEN FABRICS.

Report.—Commended for the high excellence of quality of the linen yarns, cloths, handkerchiefs, fronting linens, and damasks.

155. **Alexandrof & Alafoozof, Kazan, Russia.**

LINEN FABRICS.

Report.—Commended for the superior firmness and evenness of the flax tow yarns and cloths, and their economy and adaptation to popular use.

156. **Charlotte Zinserling, St. Petersburg, Russia.**

COTTON AND LINEN FABRICS.

Report.—Commended for excellence, variety, economy, and adaptability to purpose of the braids, webbings, and tapes.

157. **Weiss & Grohmann, Vienna, Austria.**

COTTON AND LINEN THREAD.

Report.—Commended for excellence in colors and quality of the threads.

158. **Lange & Co., Moscow, Russia.**

FLAX FABRICS.

Report.—Commended for the superior quality of the samples of linen, fire hose, and twines.

159. **Torres Novas Spinning and Weaving Co., Torres Novas, Portugal.**

LINEN FABRICS.

Report.—Commended for good qualities of linen ducks, drills, and fancy pantaloon stuffs.

160. **Bahia & Genro, Oporto, Portugal.**

COTTON AND LINEN FABRICS.

Report.—Commended for colored domestic vestings and excellent brown linen drills.

161. **Hille & Dietrich, Giradov, Warsaw, Russia.**

LINEN FABRICS.

Report.—Commended for the very great general excellence and variety of the linen fabrics, comprising duck, bed and table linen, bleached; also colored damasks of great beauty in design and combinations of colors, fringed and colored duck table cloths, bath towels, brown and bleached, and frontings.

162. **Rodrigo Antonio Ferreira Dias, Oporto, Portugal.**

COTTON AND LINEN FABRICS.

Report.—A large and substantial variety of cottonades, cotton blankets, shawls, vestings, ginghams, and brown linens.

163. **Jose Carneiro Mello, Oporto, Portugal.**

COTTON AND LINEN FABRICS.

Report.—A large display of cottonades, cotton blankets, cotton yarns, and linen drill; all of good quality and durability.

164. Esteban Ribot & Brothers, Granada, Spain.

FABRICS OF HEMP.

Report.—Commended for great variety of bags, shawls, and other articles made from these fibres, of good quality, useful, and at low cost.

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165. Antonio da Costa Guimaraes, Guimaraes, Portugal.

LINEN FABRICS.

Report.—Commended for excellent quality of bed and table linen and embroideries.

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166. Manuel Mendes Ribeiro Guimaraes, Guimaraes, Portugal.

LINEN DAMASK.

Report.—Commended for good serviceable quality of table linen, and very reasonable prices.

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167. Collective Exhibit of Wurtemberg Linen Manufacturers, Germany.

LINEN FABRICS.

Report.—Commended for the great variety and general excellence of the fabrics.

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168. Society of the Lys, Ghent, Belgium.

LINEN AND JUTE YARNS.

Report.—Commended for general excellence in quality of yarns, great softness and evenness, strength and desirable color of yarns.

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169. Frank S. Sandeman, Manhattan Works, Dundee, Scotland.

LINEN AND JUTE YARNS AND CANVAS PADDINGS.

Report.—Commended for general good quality in yarns and canvas; novelty in imitation of human hair and pads.

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170. Greenmount Spinning Co., Dublin, Ireland.

LINEN FABRICS.

Report.—Commended for great variety and excellent quality, and adaptability to purpose, of brown and striped linen drills, awning stripes, sheetings, diapers, stair drills, towels, toweling, and horse covers.

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171. Henry Matier & Co., Belfast, Ireland.

LINEN FABRICS.

Report.—Commended for superior excellence and fineness of fabric, beauty of design and embroidery in linen handkerchiefs, cuffs, and collars; and also in printed linen handkerchiefs, excellence in design and printing.

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172. John S. Brown & Sons, Belfast, Ireland.

LINEN FABRICS.

Report.—Commended for superior excellence and beauty, in design and execution, in damask table linen, extraordinary fineness in diapers, handkerchiefs, and yarn, and great excellence in linen frontings and sheetings, and for general perfection of fabrics.

173. **Fenton, Connor, & Co., Belfast, Ireland.**

LINEN FABRICS.

Report.—Commended for general excellence and variety of exhibit and superior quality of fronting linens, linen dress goods, and printed lawns.

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174. **J. N. Richardson, Sons, & Owden, Belfast, Ireland.**

LINEN FABRICS.

Report.—Commended for superior excellence and beauty, in design and execution, in damask table linen; superior fineness and quality of linen frontings and handkerchiefs.

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175. **Dicksons, Furguson, & Co., Belfast, Ireland.**

LINEN FABRICS.

Report.—Commended for superior quality of huckabacks and handkerchiefs, and general excellence and variety of articles.

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176. **Sons of Salvador Landa, Calatayud, Zaragoza, Spain.**

FLAX FABRICS.

Report.—Commended for excellent quality and adaptability to purpose, as well as economy, of the "hand-spun" linen sheetings.

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177. **Robert McBride & Co., Belfast, Ireland.**

COTTON AND MIXED COTTON AND LINEN GOODS.

Report.—Commended for neatness of design and clearness of printing on linen lawns; superior fineness and excellence of Swiss mulls and other cotton fabrics.

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178. **York Street Flax Spinning Co., Belfast, Ireland.**

LINEN FABRICS.

Report.—Commended for superior excellence of linen sheetings and fronting linens; novelty in linen brocades; skill in printed linens, and general variety and excellence of fabrics.

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179. **Van den Nieuwenhuizen and Van Stratum, Geldrop, Netherlands.**

LINEN FABRICS.

Report.—Commended for excellence and adaptability to purpose in loom dies and huckabacks.

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180. **Regenhart, Raymann, & Küfferle, Vienna, Austria.**

LINEN FABRICS.

Report.—Commended for great beauty of design and excellence of execution in colored-bordered damask table linen, as well as superior taste in coloring; also for novelty in linen shawls and scarfs.

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181. **Carl Siegel, Senior, Vienna, Austria.**

LINEN FABRICS.

Report.—Commended for the excellence and adaptability of the sheetings and napkins.

182. **William Laird & Co. (Canmore Linen Works), Forfar, Scotland.**

LINEN FABRICS AND JUTE GOODS.

Report.—Commended for general excellence and utility and great variety of fabrics in damask loom dice sheetings, ducks, towelings, osnaburgs, buckram, paddings, stair coverings, seamless bags, hessians, and horse cloths.

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183. **Remaggi Brothers, Navacchio, Pisa, Italy.**

LINEN FABRICS.

Report.—Commended for excellence and adaptability to purpose of damasks and pantalooning.

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184. **Joseph Meyer, Dresden, Germany.**

LINEN DAMASK TABLE COVERS.

Report.—Commended for superior excellence and beauty in bleached, half-bleached, and bordered table linen.

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185. **Meunier & Co., Paris, France.**

LINEN FABRICS.

Report.—Commended for the exquisite beauty in design and execution of the damask table linen, and the superior quality of their other fabrics.

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186. **Jaime Sado, Barcelona, Spain.**

LINEN FABRICS.

Report.—Commended for beauty and excellence in design and finish of damask table linen and towels.

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187. **William Wilford, Tamise, East Flanders, Belgium.**

LINEN CANVAS AND SAMPLES OF FLAX.

Report.—Commended for the excellence and adaptability of the sail cloth and the superior evenness of fabric.

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188. **Camille Devos & Brother, Courtrai, Belgium.**

LINEN AND COTTON PANTALOONING AND COUTILS.

Report.—Commended for general excellence and adaptability of the linen and cotton pantalooning, good taste in design and skill in weaving; and also for excellence in coloring and fabric of coutils.

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189. **Jacques de Brandt, Alost, Belgium.**

LINEN DAMASK AND DIAPERS.

Report.—Commended for the very great beauty in design and superior excellence of fabric and execution of the damask table linens.

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190. **Rey, Senior, Brussels, Belgium.**

LINEN FABRICS.

Report.—Commended for great variety and excellent quality of the articles exhibited, viz., household linen in all forms, damask, loom dice, sheetings, and huckabacks.

191. **Van Damme Brothers, Roulers, Belgium.**

LINEN FABRICS.

Report.—Commended for the great excellence, and adaptability for clothing for the laboring classes, of the indigo-blue linen; and also for the superior excellence of the coloring.

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192. **G. Stenberg's Widow, Jönköping, Sweden.**

LINEN FABRICS.

Report.—Commended for beauty and excellence in design and fabric of damask table linen.

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193. **Stevens Linen Works, Webster, Mass., U. S.**

BLEACHED AND BROWN LINEN FABRICS.

Report.—Commended for superior excellence, in quality and utility, of their plain and twilled crash toweling, diapers, and huckabacks.

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194. **Ph. Vrau & Co., Lille, France.**

LINEN THREADS AND TWINES.

Report.—Commended for excellence and variety of the linen threads and twines.

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195. **Green & Daniels, Pawtucket, R. I., U. S.**

SEWING COTTON.

Report.—Commended for economy, adaptability, and good finish of the three-cord sewing cotton.

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196. **John Clark, Jr., & Co., Glasgow, Scotland.**

SEWING COTTON.

Report.—Commended for excellence in color, quality, and finish of the six-cord sewing cotton.

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197. **Jonas Brook & Brothers, Meltham Mills, Huddersfield, England.**

SEWING COTTON.

Report.—Commended for variety and general excellence of crochet, embroidery, and sewing cotton.

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198. **John Dewhurst & Sons, Belle Vue Mills, Skipton, England.**

SEWING COTTON.

Report.—Commended for economy, adaptability, and excellent finish of the glace three-cord sewing cotton.

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199. **Hassebroucq Brothers, Comines, France.**

LINEN THREADS.

Report.—Commended for the excellence in quality, variety in color, and the very neat manner of putting up for use of the linen sewing threads.

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200. **Cox Brothers, Dundee, Scotland.**

JUTE CORDS.

Report.—Dressed cords, jute yarn, carpet twist, and dyed twist. Commended for superior evenness and smoothness and excellent color in the dyed goods.

201. Van de Wynckete Brothers Alsberge, Ghent, Belgium.

BLEACHED YARNS AND THREADS IN EVERY STAGE.

Report.—Commended for general good quality of products; fine white of bleached yarns; strength of yarns and threads.

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202. Ullathorne & Co., Durham, England.

SHOE THREADS.

Report.—Commended for superior quality and evenness of yarns, great variety and brilliancy of colors, great utility of the articles manufactured.

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203. Dunbar, McMaster, & Co., Gilford, Ireland.

LINEN THREADS, GRAY, BLEACHED, AND DYED.

Report.—Commended for superior excellence in quality and colors, general variety of products, novelty and specialty in flosses, splendid collection of goods in every respect.

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204. Ebaert Cools, Alost, Belgium.

LINEN YARNS AND SEWING THREAD.

Report.—Commended for general good quality of yarns and threads; also for variety of fine colors.

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205. Marques Caralt & Co., Barcelona, Spain.

HEMP THREADS.

Report.—Commended for economy and adaptability to purpose of the hemp shoe threads.

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206. Cartier-Bresson, Paris, France.

SEWING COTTON.

Report.—Commended for excellence in quality and color of the sewing cotton.

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207. C. G. Billeter, Zurich, Switzerland.

SINGED COTTON THREAD AND OTHER THREADS.

Report.—Commended for the peculiar softness, evenness, and strength, and special adaptation to the use for which they are intended.

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208. Hilversum Steam Spinning and Weaving Manufactory, Amsterdam, Netherlands.

COTTON FABRICS.

Report.—Honest, strong, durable, and well-made drills and sheetings.

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209. Barbour Flax Spinning Co., Paterson, N. J., U. S.

FLAX YARNS AND THREADS.

Report.—Commended for excellence in quality and color of threads; general utility of product.

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210. American Linen Thread Co., Mechanicville, N. Y., U. S.

LINEN THREAD AND YARN.

Report.—Commended for smoothness, evenness, and excellence in all respects, of their flax products of American manufacture.

211. **Neptune Twine Mills, Emery Johnson, Proprietor, East Haddam, Conn., U. S.**

TWINE AND CORD.

Report.—Peculiar even and strong seine twine and other cords.

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212. **J. & P. Coats, Paisley, Scotland.**

SEWING COTTON.

Report.—Commended for the superior strength and excellent quality of spool cotton.

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213. **Marshall & Co., Leeds, England.**

LINEN SEWING AND OTHER THREADS.

Report.—Commended for superior excellence in quality and color of threads; specialities and general variety of goods; a very superior collection of goods in every respect.

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214. **Baron Stieglitz, near Narva, Russia.**

CANVAS.

Report.—Commended for excellence in all respects of the sail duck, of various grades of fineness.

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215. **Druid Mills, Baltimore, Md., U. S.**

COTTON SAIL DUCK.

Report.—Commended as clean, well manufactured, even, and well adapted for its purpose.

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216. **Thomas Hall, Edinburgh, Scotland.**

HAND-PAINTED CLOTHS, IN IMITATION OF TAPESTRY, FOR WALL DECORATION.

Report.—The novel application of scene decorations for domestic purposes, carried out by two very effective landscape paintings, size nine feet by six feet, painted in water-colors on jute canvas, adapted for inside walls and panels.

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217. **Michael Nairn & Co., Kirkcaldy, Scotland.**

FLOOR OIL CLOTHS.

Report.—Commended for excellent workmanship and material; for tasteful designs and beautiful colors; extraordinary and unequaled size; flexibility and superior quality.

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218. **H. Loewenberg, Charlottenburg, near Berlin, Germany.**

IMITATION OF LEATHER RELIEF ORNAMENTS FOR HATS, BOOTS, AND SHOES.

Report.—Commended for novelty of material, variety of objects, and fitness to the purposes intended.

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219. **Boulinikon Floor Cloth Manufacturing Co. (Limited), Manchester, England.**

FLOOR CLOTH.

Report.—Commended for originality in material, adaptation to public wants, and fitness to the purposes intended; also for good quality, fair designs, flexibility, apparently great durability, and moderate prices.

220. **Joseph Sak-Volders, Turnhout, Belgium.**

FLAX TICKINGS AND AWNING STRIPES.

Report.—Commended for excellence in color and quality of the tickings and awning stripes.

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221. **Commission-General for the National Exhibitions, Brazil.**

COTTON CLOTHS AND HAMMOCKS.

Report.—Commended for the variety of their exhibition, and the adaptability of the articles exhibited to popular wants, including hammocks of different materials from different provinces; cotton fabrics, plain, colored; quilts, towels.

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222. **Mayall Manufacturing Co., Boston, Mass., U. S.**

PATENT ANTI-MOTH CARPET LINING.

Report.—The cotton is pressed with an anti-moth preparation, and dried thoroughly on hot cylinders; full thirty-six inches wide; perforation of the lining, one-ply cloth and twenty per cent. paper, besides the cotton. The perforation is made to allow the dust to settle on the floor. Especially adapted to hotels and public buildings. Commended for excellence.

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223. **National Rope Yard, Lisbon, Portugal.**

CANVAS.

Report.—Commended for the fair and serviceable quality of canvas, well suited to use.

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224. **The Mount Vernon Co., Baltimore, Md., U. S.**

COTTON DUCK AND TWINE.

Report.—Commended for the strength and utility of their wide duck, for car roofs and other purposes, and for the even, good quality of their twine.

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225. **Local Government of Ni-i-gata-ken, Japan.**

RAMIE CLOTH.

Report.—Commended for the variety and adaptability of the ramie fabrics, as well as the ingenuity shown in the use of printed or dyed yarns, producing figures when the cloth is woven.

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226. **Local Government of Nara-ken, Japan.**

BLEACHED HEMP CLOTH.

Report.—Commended for the fineness of the fabric produced from hemp, and its adaptability to the purposes of clothing for which it is intended.

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227. **Municipality of Osaka, Japan.**

COTTON RUGS.

Report.—Commended for utility and adaptability to intended purpose.

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228. **Association for Women's Work, Kiyoto, Japan.**

COTTON RUGS—DANTSUORI.

Report.—Commended for the peculiar method of working cotton into a useful rug of peculiarly attractive style.

229. **Imperial Board of Agriculture, Commerce, and Industry, Tokio, Japan.**

COTTON RUGS.

Report.—Commended for utility and adaptability to purpose of the collection of plain and colored mattings.

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230. **W. Walcker, Paris, France.**

MILITARY AND GARDEN TENTS.

Report.—Commended for the very great variety of military, picnic, and garden tents, combining excellence of material with convenience of form, extreme strength, and simplicity of adjustment, in a remarkable degree.

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231. **José Feced, Manila, Philippine Islands.**

CLOTH FROM THE MANILA HEMP.

Report.—Commended for the fineness and delicacy of the cloth made from the fibre of the "Musa textilis," or Manila hemp.

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232. **Mechanical Net Manufacturing and Weaving Stock Co., Itzehoe, Holstein, Germany.**

NETS AND SAIL CLOTH.

Report.—Commended for very good quality of cotton and linen nets; first-rate workmanship; goods made of the best yarn with great care.

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233. **George W. Chipman & Co., Boston, Mass., U. S.**

CARPET LININGS AND STAIR PADS.

Report.—Commended for excellence in all the following properties: elasticity, softness, overcomes unevenness in the floor, warmth in winter, coolness in summer, water-proof, preventing water from leaking through floors and ceilings; made with such excellence in seaming, lapping both in the ordinary selvage of sewing and a tape strip, as to prevent the inner material from working or raveling out.

Cedrinated carpet lining is anti-moth and anti-insect in its medicated properties, free from oil or oily substance attracting mice or vermin of any kind. A solution of sugar of lead also prevents mildew. The entire exhibit very full and satisfactory.

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234. **Methuen Mill, Webster Mill, and Nevens Bag Mill (Nevens & Co.), Boston, Mass., U. S.**

HEAVY BAGGING MADE FROM JUTE.

Report.—Commended for even texture and adaptation to use, good manufacture, and closeness in the web.

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235. **Rosenlund Cotton Manufacturing Co., Goteborg, Sweden.**

COTTON DUCK, TWINE, AND YARN.

Report.—Commended for evenness, strength, and thorough honesty in the fabrics.

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236. **Rebello & Co., Rio de Janeiro, Brazil.**

COARSE COTTON FABRICS.

Report.—Commended for the even spinning, good color, and excellent combination of their striped osnaburgs.

237. **Barlow & Jones (Limited), Manchester, England.**

VESTINGS, MARSEILLES QUILTS, AND CRETONNES.

Report.—Commended for the general excellence and variety of the goods exhibited, and for the special beauty and quality of the Marseilles quilts, which appear to us to be unequaled in style and quality.

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238. **Christiania Sail Cloth Manufactory, Christiania, Norway.**

SAIL CLOTH, YARNS, AND TWINES.

Report.—Commended for excellence and adaptability to purpose.

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239. **Lawrence, Waterbury, & Co., New York, N. Y., U. S.**

JUTE BAGGING.

Report.—Commended for its very excellent manufacture and its adaptability to baling cotton.

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240. **Thomas Potter, Sons, & Co., Philadelphia, Pa., U. S.**

OIL CLOTH.

Report.—Commended for their very great variety, excellent quality, numerous, original, and artistic designs, rich finish and colors; admirable in every way.

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241. **American Linoleum Manufacturing Co., New York, N. Y., U. S.**

LINOLEUM FLOOR CLOTH.

Report.—Commended for the beauty and finish of their designs and colors, and excellent qualities of the cloth.

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242. **Hamilton Webbing Co., Wickford, R. I., U. S.**

WEBBING FOR BOOT AND SHOE STRAPS.

Report.—Commended for excellence, strength, good color, and fitness for service.

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243. **James Riddle, Son, & Co., Wilmington, Del., U. S.**

TICKINGS.

Report.—Variegated colors and plain blue striped. Commended for excellence in twill and colors; double warp, 104 picks; pure cotton; peculiarly novel fabric.

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244. **Falls Co., Norwich, Conn., U. S.**

COTTON AWNINGS AND TICKINGS.

Report.—Awning stripes, wide striped tickings. Commended for excellent fabric and color of awning stripes, clear white and blue in tickings, and great smoothness in stripe and texture.

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245. **John Farnum & Co., Conestoga Steam Mills, Philadelphia, Pa., U. S.**

TICKINGS.

Report.—Sixty-inch wide specially noteworthy. Commended for excellence of materials, color, weaving, and good variety.

246. **Gale & Co., Boston, Mass., U. S.**

TENTS.

Report.—Commended for excellence in the employment of an expanding and folding frame for distending the upper part of a tent; very novel and adapted to all out-door purposes, where lawn, beach, hunters' and camp tents are used; quick folding against sudden storms, or strongly fortifying all sides, enabling them to stand against wind or rain; economy and adaptation.

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247. **David Trainer & Sons, Omega Manufacturing Co., Linwood, Pa., U. S.**

TICKINGS.

Report.—These tickings are strictly first-class, and excel in herring-bone twill. Commended for fineness of yarn and peculiarly good colors.

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248. **Ignaz Richter & Sons, Niedergrund, Bohemia, Austria.**

COTTON VELVETS.

Report.—Commended for great variety of distinctly shaded colors, fully one hundred and twenty different colorings; entirely odorless; evenness of fabric, silky finish, and durability.

---

249. **Juan Conti, Barcelona, Spain.**

COTTON TURKISH GARMENTS AND COTTON FABRICS.

Report.—Remarkable for novelty of design in Turkish garments for ladies; colors delicately and exquisitely done; towels, table covers, material for garments; exceedingly well done. The entire exhibit is admirable.

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250. **Weigert & Co., Berlin, Germany.**

COTTON CHENILLE SHAWLS.

Report.—Commended for the novelty of fabric and excellent quality of this especial specimen of cotton goods, beauty of coloring, and economy in cost.

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251. **Parellada, Flaquer, & Co., Barcelona, Spain.**

CORDUROY COTTON COLORED FABRICS.

Report.—Commended for variety and excellence of colors, strength of fabric, economy, and durability.

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252. **M. R. Oetiker, Mannedorf, Zurich, Switzerland.**

WHITE AND COLORED QUILTS AND TABLE CLOTHS.

Report.—Commended for unusual excellence in style and weaving.

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253. **Dundas Cotton Mills, Hamilton, Ontario, Canada.**

HEAVY BROWN SHEETINGS AND SEAMLESS BAGS.

Report.—The sheetings are very even, firm, and very clean, and the bags are of a very superior quality.

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254. **Garsed Brothers, Frankford, Pa., U. S.**

TICKINGS.

Report.—Commended for superior quality, brilliancy in colors, and strength of cloth.

255. York Manufacturing Co., Saco, Me., U. S.

TICKINGS, NANKEENS, DENIMS, AND FANCY WOVEN FABRICS.

Report.—Nankin plaids and stripes, excellent; denims, plaids, and stripes, very novel; tickings, peculiarly adapted for good service. In their goods the designs are excellent and novel, the weaving very even, and the quality is unsurpassed.

256. Everett Mills, Lawrence, Mass., U. S.

FANCY COTTONS, COTTONADES, AND CHEVIOTS.

Report.—Commended for excellence in subdued coloring, smoothness of fabrics, general good taste in design, of cheviot shirtings; cottonades of very good quality.

257. Amoskeag Manufacturing Co., Manchester, N. H., U. S.

TICKINGS, DENIMS, AND DOMESTIC GINGHAMS.

Report.—Ginghams, excellent in red, orange, and black combination, heretofore almost confined to foreign goods; pink clear and well colored; green in all shades remarkably fine.

Plaids and tickings, known as A C A, very superior.

Awnings in blue and red stripes, and denims in blue and brown, excellent.

Cheviot shirtings of excellent fabric and peculiarly good combination of colors.

258. Gervasio Amat, Gracia, Barcelona, Spain.

ESPARTO MATS.

Report.—Commended for the excellence in quality, and economy of production, of the mattings of esparto grass.

259. Imperial Maritime Customs of China.

MATTINGS, GRASS CLOTH, COTTON, AND COTTON CLOTH.

Report.—Commended for the great variety and excellence of the exhibit, comprising rattan mats, grass cloth in great variety of quality, bamboo, cloth mats from Takon, pine-apple cloth, hemp cloth from Formosa, and mats, woven by the aborigines, from the same place, cotton, white and yellow, and cotton cloths, bleached and unbleached, dyed and printed, nankeens, hemp, fine and coarse, from various provinces, and hemp cloth, hemp skins (so called), or fibre of the Bohmeria, China grass, pineapple fibre, and coir or cocoa-nut fibre; being a very large, instructive, and valuable collection.

260. Fergusson & Co., Chefoo, China.

STRAW BRAID.

Report.—Commended for the variety and excellence of the straw braids of various qualities.

261. Russell & Co., Canton, China.

MATS.

Report.—Commended for the superior excellence of the straw mattings of various grades.

262. J. Forbes Watson, Director Indian Museum, British India.

VEGETABLE FIBRES.

Report.—Commended for the large and valuable collection of samples of cotton, flax, rheea, hemp, aloe, musa, and other vegetable fibres, embracing over forty species of great value, exhibited by the Museum under his care.

263. **Paola Vincenzi, Carpi, Modena, Italy.**

WOVEN BRAIDS AND TRIMMINGS OF WOOD.

Report.—Commended for the ingenuity and evenness of fabric of the woven braids and trimmings made of wooden fibres, representing an important branch of industry.

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264. **Govaert Brothers, Alost, East Flanders, Belgium.**

JUTE FABRICS.

Report.—Commended for the economy of fabrication, excellence of quality, and adaptability to purpose of the jute bagging and bags for salt, grain, etc., and also for the evenness of the sail cloth.

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265. **Severino Leite, Minas Geraes, Brazil.**

VEGETABLE HAIR.

Report.—Commended for good quality and great variety of the fibre, in all its processes, novelties in manufactured goods thereof, and variety in specialities.

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266. **E. W. Rudder, Kempsey, New South Wales, Australia.**

FIBRE OF GIGANTIC NETTLE-TREE.

Report.—Fibre of gigantic nettle-tree and bark of sycamore-tree. Commended for discovery of fibre and adaptation for trade purposes, utility thereof, comparative smoothness.

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267. **Thomas Longmire, Kooroocheang, Smeaton, Victoria, Australia.**

FLAX STALKS, SEEDS, AND JUTE.

Report.—Very fair specimens, of good quality.

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268. **Thomas McPherson & Co., Melbourne, Victoria, Australia.**

JUTE.

Report.—Long and soft jute, strong in fibre and of very good quality.

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269. **Government of the Loo-Choo Islands, Japan.**

VEGETABLE FIBRES.

Report.—Commended for the value of the collection of vegetable fibres, China grass.

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270. **Government of Venezuela, Venezuela.**

COCUIZA FIBRES, COTTON, AND MANUFACTURES OF VEGETABLE FIBRES.

Report.—Commended for the excellent quality of the cotton, white and yellow; the value of the samples of the fibre of the "Fourcroya gigantea," called cocuiza, raw and colored; and the excellence and adaptability of the hammocks, halters, girths, and cruppers made of palm and other fibres.

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271. **T. Asaya, Tokio, Japan.**

VEGETABLE FIBRES.

Report.—Commended for the value of the collection of vegetable fibres, viz., hemp, ramie, and jute.

272. **Governor of the Jail of Santona, Province of Santánder, Spain.**

STRAW FABRICS.

Report.—Commended for the great beauty and ingenuity of the different products made from wheat straw by convict labor.

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273. **Robert Thompson, Superintendent Government Botanical Gardens, Gordon Town, Jamaica.**

VEGETABLE FIBRES.

Report.—Commended for the large and important collection of vegetable fibres, destined to be of great importance to manufactures.

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274. **J. C. Read, Governor of the Darlinghurst Jail, Sydney, New South Wales, Australia.**

MATTING, MADE BY THE ABORIGINES.

Report.—Commended for excellence in quality and variety of product.

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275. **Dr. James Hector, Wellington, New Zealand.**

VEGETABLE FIBRES AND FABRICS.

Report.—Commended for the large and valuable collection of fibres of vegetable origin, with samples of the fabrics produced therefrom, especially of the "phormium tenax" or New Zealand flax, indicating the direction of a new and important industry.

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276. **Corps of Mountain Engineers, Madrid, Spain.**

FABRICS OF ESPARTO GRASS.

Report.—Commended for excellence in quality and design, well suited to their respective purposes, and of peculiar merit for their cheapness.

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277. **Local Government of the Loo-Choo Islands, Japan.**

FABRICS OF COTTON, HEMP, AND PLANTAIN FIBRE.

Report.—Commended for the variety of articles exhibited, showing the ordinary fabrics of the country and the adaptability of the hemp and plantain fibre cloths for use in hot climates.

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278. **Commissioners for Victoria, Melbourne, Victoria, Australia.**

VEGETABLE FIBRES.

Report.—Commended for the very large and valuable collection of vegetable fibres exhibited; destined to be of great importance in the future development of manufacturing industry.

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279. **Provincial Board of Batangas, Philippine Islands.**

FABRICS OF VEGETABLE FIBRE.

Report.—Commended for the great variety of fabrics of pineapple and other fibres, of great beauty and delicacy, collected and exhibited by them, as well as for the collection of the fibres themselves.

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280. **Tiburcio Villamarzo, Tayabas, Philippine Islands.**

VEGETABLE HAIR FIBRE.

Report.—Commended as well adapted for submarine purposes, impervious to water rot, very flexible, adapted to weaving and rope-making.

281. Government of Portugal, Province of Angola.

WOODED FIBRE.

Report.—Commended as well prepared, very fibrous, strong, flexible, adapted to many manufacturing purposes.

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282. Provincial Board of Antique, Philippine Islands.

FABRICS OF VEGETABLE FIBRE.

Report.—Commended for the great variety of fabrics of pineapple and other fibres, of great beauty and delicacy, collected and exhibited by them, as well as for the collection of the fibres themselves.

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283. Provincial Government of Camarines (North), Philippine Islands.

VEGETABLE FIBRES.

Report.—Commended for the excellence in length and strength of the fibres of the collection of Manila hemp, "Musa textilis."

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284. Provincial Government of Camarines (South), Philippine Islands.

VEGETABLE FIBRES.

Report.—Commended for the excellent quality in length and strength of the fibres of Manila hemp, "Musa textilis."

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285. Enrique Bushell, Hellin, Murcia, Spain.

ESPARTO GRASS.

Report.—Commended for the remarkable length and excellence of the esparto grass, showing the effect of careful cultivation.

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286. Dr. Agostinho Emelindo de Leão, Parana, Brazil.

VEGETABLE FIBRES.

Report.—Commended for the value of the fibres of *Bilbergia tinctoria* for purposes of cordage.

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287. J. Horne, Director Botanic Garden, Mauritius.

VEGETABLE FIBRES.

Report.—A large and valuable collection of vegetable fibres, destined to be of great future value as subjects of manufacture.

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288. Severino Lourenço da Costa Leite, Brazil.

VEGETABLE FIBRES.

Report.—Commended for the value and beauty of the fibres of the asclepias, and also for the four different specimens of "vegetable wool," so called from different species of palm-tree and the fibre of the malpighiosa.

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289. Commissioners for Queensland, Australia.

VEGETABLE FIBRES.

Report.—A large and interesting collection of fibres of vegetable origin, destined to be of great future importance in manufactures.

290. **José Rodriguez Vigan, Yloco Sur, Philippine Islands.**

VEGETABLE FIBRES.

Report.—Commended for the value of the fibre of the *Agave vivipara*.

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291. **Henry Prestoe, Government Botanist, Trinidad.**

VEGETABLE FIBRES.

Report.—Commended for the interesting and varied collection of fibres of vegetable origin collected and exhibited by him, and for their prospective value as subjects for manufacture.

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292. **Fray Nicolas Zugadi, Bulacan, Philippine Islands.**

VEGETABLE FIBRE.

Report.—Commended for the excellence and adaptability for hats and mats of the fibres of the sygodium or climbing fern, called *Nito limpis*.

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293. **Commissioners of New Zealand.**

PHORMIUM.

Report.—A general collection of the fibre, illustrating all manner of preparation and applications for the manufacture of rope, cordage, yarn, cloth, and paper. Commended for great labor and pains, and for economy and quality of the different products.

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294. **Botanical Gardens, Melbourne, Victoria, Australia.**

FIBRES OF DIFFERENT TREES AND PLANTS.

Report.—Commended for discovery, adaptation for trade purposes, perseverance in preparation thereof, general utility, of following fibres: flume-tree, bottle-tree, lantern-flower, Chinese grass, cloth-plant, tree-nettle: large assortment, of great variety; good-colored jute.

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295. **Robert Thompson, Superintendent Botanical Gardens, Gordon Town, Jamaica.**

SISAL HEMP AND CHINA GRASS.

Report.—Commended for the great utility of all these fibres in the collection, especially sisal hemp, China grass, pineapple, bamboo, lace bark, especially adapted for ornamental purposes; of novelties and good quality; utility of bamboo for paper manufacturing especially noted.

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296. **National Museum, Cairo, Egypt.**

FLAX, SILK IMITATIONS, AND BARKS.

Report.—Commended for good quality and color and great variety of flax, and for fine silk imitations; also for great variety of barks.

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297. **Province of Bahia, Brazil.**

VEGETABLE HAIR AND JUTE.

Report.—Commended for fair quality of jute, good length, and fair color.

298. **Government of the State of Hidalgo, Pachuca City, Mexico.**

VEGETABLE FIBRES AND FABRICS.

Report.—An admirable collection of fibres and textile fabrics of the *Agave Americana*, coarse, fine, and colored, with a representation of the plant in wax.

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299. **Government of the State of Yucatan, Mexico.**

VEGETABLE FIBRES AND FABRICS.

Report.—Commended for the very fine collection of hammocks, mats, and bagging, and small cordage made of the fibres of the maguey plant or agave, with the exhibit of fibres of the same, of great length and strength.

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300. **R. S. Dabney, Fayal, Azores Islands.**

MANUFACTURES OF GRASS AND STRAW.

Report.—Commended for excellence, economy, and adaptability of fibres and fabrics

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301. **Manuel Machado, Fayal, Azores Islands.**

MATTINGS AND BRUSHES.

Report.—Commended for excellence, economy, and adaptability of the mattress and pillow mats, brushes, and other articles, made of pine shavings.

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302. **Almeida & Silva, Oporto, Portugal.**

MATTINGS.

Report.—Commended for adaptability and economy of the rush matting.

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303. **Joaquim d'Oliveira Melindre, Oporto, Portugal.**

MATTINGS.

Report.—Commended for the design and execution of the colored rush mattings.

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304. **Manoel Dias da Silva, Oporto, Portugal.**

MATTINGS.

Report.—Commended for excellence, economy, and adaptability.

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305. **Manoel d'Oliveira, Margarido, Oporto, Portugal.**

FABRICS OF VEGETABLE MATERIALS.

Report.—Commended for excellence and ingenuity of the mats, flask-covers, and other articles made of rushes.

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306. **Juana de Foneira, Fayal, Azores Islands.**

MATS AND HATS.

Report.—Commended for ingenuity and excellence of the mats and hats made of pine shavings.

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307. **Colonial Government of Cape Verde, Portuguese Colonies.**

VEGETABLE FIBRES AND FABRICS.

Report.—A valuable collection of fibres, of great industrial promise, and also of mats and baskets produced from the same.

308. **Provincial Committee of Amazonas, Brazil.**

VEGETABLE FIBRES FROM TREES.

Report.—Commended for excellence and interest, and adaptability for various purposes.

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309. **Francisco Garcia Calatrava, Alcobendas, Madrid, Spain.**

ESPARTO GRASS.

Report.—Commended for the superior length and strength of the fibre of cultivated esparto grass.

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310. **Botanical Museum, Buitenzorg, Java.**

VEGETABLE FIBRES.

Report.—A large and varied collection of fibres of vegetable origin, destined to be of great future importance to manufacturers.

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311. **Municipal Chamber of Santarem, Bahia, Brazil.**

VEGETABLE FIBRES.

Report.—Commended for the value of the fibres of *Urena lobata* and *Astrocarium Tucuman*, suitable for cordage, fish lines, and hammocks.

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312. **Bruno da Silva, Lisbon, Portugal.**

MATTINGS.

Report.—Commended for adaptability and excellence of quality.

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313. **Francisco Prast Banon, Hellin, Albacete, Spain.**

ESPARTO GRASS.

Report.—Commended for the improvement made by cultivation on the fibres of esparto grass.

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314. **Colonial Government of Mozambique, Portuguese Colonies.**

VEGETABLE FIBRES.

Report.—Commended for the valuable collection of fibres of great industrial promise, and the baskets, mats, and other fabrics produced from the same.

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315. **Muñoz Brothers, Albay, Philippine Islands.**

VEGETABLE FIBRES.

Report.—Commended for the excellence in quality of the fibres of the Manila hemp and "Cabo negro" palm.

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316. **Portuguese Government, Lisbon, Portugal.**

VEGETABLE FIBRES.

Report.—A large and varied assortment of fibres of vegetable origin, from Portugal and her colonial possessions.

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317. **Colonial Government of Angola, Portuguese Colonies.**

VEGETABLE FIBRES.

Report.—A valuable collection of fibres of great industrial promise, and articles of native workmanship produced from the same.

318. **Tomas Gallegos, Albay, Philippine Islands.**

BANANA FIBRE.

Report.—Commended for the beauty and adaptability to manufacture of the banana fibre.

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319. **Colonial Government of Macao and Timor, Portuguese Colonies.**

VEGETABLE FIBRES.

Report.—A valuable collection of fibres of great industrial promise, and of mats and other fabrics produced from the same.

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320. **Dr. Eduardo Orduña, Batangas, Philippine Islands.**

VEGETABLE FIBRES.

Report.—A large collection of valuable vegetable fibres from "*Musa textilis*" and other plants.

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321. **Province of Bahia, Brazil.**

VEGETABLE FIBRES.

Report.—Commended for the value, for purposes of cordage, of the fibre of "*Fourcroya gigantea.*"

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322. **Colonial Government of Portuguese India, Portuguese Colonies.**

VEGETABLE FIBRES.

Report.—A valuable collection of fibres of great industrial promise, and also the fabrics produced from the same.

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323. **Charles Chinnery, Addington, Canterbury, New Zealand.**

PHORMIUM FIBRE.

Report.—Commended for excellent quality of fibre for roping purposes, great strength, careful preparation.

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324. **Brotons Brothers, Orihuela, Alicante, Spain.**

FLAX AND JUTE FIBRE.

Report.—Commended for smoothness, length, and strength of fibre; the flax of silky finish.

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325. **Segunda Flores, Manila, Philippine Islands.**

MANUFACTURE OF FIBRES.

Report.—Commended for the great beauty and exquisite delicacy of the silk and pine-apple fibre dresses and handkerchiefs.

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326. **Placido Yuson, Yloilo, Philippine Islands.**

MANUFACTURES OF VEGETABLE FIBRES.

Report.—Commended for fineness and beauty of the fabric of "yusi" and silk.

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327. **Joseph Wild & Co., New York, N. Y., U. S.**

COCOANUT FIBRE CARPETS.

Report.—Striped and plain carpet of unusual evenness and general excellence

328. **Wakefield Rattan Co., Wakefield, Mass., U. S.**

RATTAN GOODS.

Report.—Commended for variety, novelty, utility, and unsurpassed excellence.

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329. **Asbestos Patent Fibre Co., Chatham Mills, Philadelphia, Pa., U. S.**

ASBESTOS FIBRE AND FABRICS.

Report.—Very superior fibre for steam packing, especially adapted to meet a present want in steam joints; excellent non-combustible paper, the first real success of the kind, as far as is now known; water and steam pipes, either for outside covering of iron pipes or for use in themselves for the transmission of water or steam. Commended for superiority in manufacture, non-expansion, non-contraction, very little friction, economy in prices and uses.

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330. **H. W. Johns, New York, N. Y., U. S.**

ASBESTOS FIBRE AND FABRIC.

Report.—Variety of fibre, domestic and foreign. Roofing, excellent, durable, economical, especially resisting outside heat and fire. Asbestos covering on wood, put on in the liquid state and solidified by the action of the air. Greatest success in fire-proof outer and inner coating, covering felt, and rough hair fabrics.

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331. **J. H. Ter Horst, Rijssen, Netherlands.**

JUTE AND FLAX GOODS.

Report.—Commended for general excellence, good quality, and strength of burlaps and bags.

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332. **Count Augusto Polidori, Anghiari, Arezzo, Italy.**

GRASSES, PREPARED GINESTRO.

Report.—Commended as well prepared in all respects for commercial purposes, fineness and tenacity of fibre; well adapted to the manufacture of grass goods.

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333. **Manuel Mas & Son, Alicante, Spain.**

FABRICS OF ESPARTO GRASS.

Report.—Mattings and other fabrics of esparto grass, of excellent quality, well adapted to use, at low cost, and showing the great improvement made in the fibre by careful cultivation.

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334. **Cesare Vecchietti, Florence, Italy.**

GINESTRO GRASSES.

Report.—Commended for remarkable flexibility; well adapted to the various uses to which such grasses can be put.

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335. **Eduardo Orduna, Batangas, Philippine Islands.**

COTTON.

Report.—Commended for the good quality of the cotton.

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336. **Ryder Brothers, Mango Island, Fiji.**

SEA-ISLAND COTTON.

Report.—Commended for extraordinary length of staple, fineness and strength, and good handling.

337. **Agricultural Museum, St. Petersburg, Russia.**

COTTON.

Report.—Commended for the variety of samples of cotton, viz., sea-island, short staple, and nankin, grown in Turkestan.

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338. **Provincial Government of Batangas, Philippine Islands.**

COTTON.

Report.—Commended for the excellence of the samples of cotton and the yarns spun from the same.

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339. **Procesa Dimayuga, Batangas, Philippine Islands.**

COTTON.

Report.—Commended for the good quality of the cotton, being the best shown from the East Indies, and for the evenness of the yarn spun from the same.

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340. **Khedive of Egypt, Cairo, Egypt.**

SAMPLES OF RAW COTTON.

Report.—A large and varied exhibit of Egyptian cotton samples, of excellent staple.

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341. **Government of Brazil, Rio de Janeiro, Brazil.**

RAW COTTON.

Report.—The best display of cotton in quantity and variety from any foreign country.

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342. **Government of Queensland, Australia.**

RAW COTTON.

Report.—Eight small samples of upland cotton, well handled, and fair staple.

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343. **Government of Portugal, Portuguese Colonies.**

RAW COTTON.

Report.—Although the samples shown are too small to receive an award as an actual commercial exhibit by individuals, they are deserving of one as an exhibit of the capabilities of the districts wherein they were grown, and the enterprise of the government which has collected them, as well as for the promise which they offer for the future.

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344. **T. A. Beckett, John's Island, S. C., U. S.**

SEA-ISLAND COTTON.

Report.—Commended for unusual fineness, length, strength, and preparation.

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345. **Wm. Taylor, Philips County, Arkansas, U. S.**

RAW COTTON, COMMERCIAL BALE.

Report.—Commended for extraordinary fineness, silky appearance, good staple, and excellent ginning.

346. **Adams Kellogg, Kellogg's Landing, Madison Parish, Louisiana, U. S.**

RAW COTTON, COMMERCIAL BALE.

Report.—Commended for extraordinary strength of staple, brightness of color, and good handling.

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347. **Benjamin Montgomery (colored), Warren County, Miss., U. S.**

RAW COTTON, COMMERCIAL BALE.

Report.—Commended for very extraordinary length of staple and good handling.

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348. **Claghorn, Herring, & Co., Philadelphia, Pa., U. S.**

RAW COTTON IN VARIETY.

Report.—The best exhibit of commercial bales of raw cotton from all parts of the world; also cotton in the seed and on the plant.

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349. **J. M. Seabrook, South Carolina, U. S.**

SEA-ISLAND COTTON (RAW).

Report.—Commended for extra length, strength, and fineness of staple.

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350. **Charles Taulez-Bottelier, Bruges, Belgium.**

FLAX.

Report.—Commended for very good quality and nice variety, specially in strong and soft flaxes, ordinarily long.

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351. **Pietro F. Facchini & Co., Bologna, Italy.**

HEMP AND FLAX.

Report.—Commended for superior excellence in raw, scutched, and combed flaxes and hemp; great strength and length of products; fine lines and clean soft tows; clearness of color and brightness of white and yellow unsurpassed; splendid specimens of the product of Italy.

---

352. **Henry Le Clercq, Courtrai, Belgium.**

FLAX.

Report.—Commended for superior excellence of quality; splendid collection of the flaxes of Belgium; beautiful colors; rare softness of fibre; great strength: unsurpassed in the whole exhibition.

---

353. **S. S. Fuller, Stratford, Ontario, Canada.**

FLAX.

Report.—Commended for good quality and long staple.

---

354. **Joaquim Rodrigues, Oporto, Portugal.**

FLAX.

Report.—Commended for excellence in length and strength of the combed flax.

---

355. **State of Oregon, U. S.**

FLAX.

Report.—Very fair quality, considerable strength, good color, and well prepared.

356. **Province of Parana, Brazil.**

FLAX AND JUTE.

Report.—Fair quality of the flax. The jute is more highly recommended.

---

357. **Dutch Association for the Encouragement of Flax Industry, Rotterdam, Netherlands.**

FLAX AND LINSEED.

Report.—Commended for first-rate quality of fibre, strength and vigor of fibre, fine dark color, softness and general beauty of material.

---

358. **Nicholas Vassilief, Pskof, Russia.**

FLAX FIBRES.

Report.—Commended for the very large collection and the great beauty and strength of the flax fibres.

---

359. **Anthony Nemilof, Orel, Russia.**

HEMP.

Report.—Commended for the excellence, in length and strength, of the dressed hemp.

---

360. **A. F. Van Casteel, Rotterdam, Netherlands.**

DRESSED FLAX.

Report.—Commended for the great length and excellent quality of fibre of the Dutch, Zealand, and Friesland dressed flax.

---

361. **Zealand Association for the Promotion of Agriculture, Middelburg, Netherlands.**

DRESSED FLAX AND HEMP.

Report.—Commended for the great excellence of the specimens of dressed hemp and flax.

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362. **Loring Brothers, Malaga and Granada, Spain.**

ESPARTO GRASS.

Report.—Commended for the excellent quality of the esparto grass, showing the great improvement in the fibre by careful cultivation and attention.

---

363. **Clement Nemilof, Rjef, Tver, Russia.**

HEMP.

Report.—Commended for the excellent quality of the dressed hemp in all states of progress, from the hackle to "dressed line."

---

364. **W. H. Dabney, Azores Islands, Portuguese Colonies.**

FLAX FIBRE.

Report.—Commended for the good quality of the specimens of dressed and half-dressed flax, showing the resources of the islands.

365. **Committee of the Riga Exchange, Riga, Russia.**

FLAX AND HEMP.

Report.—Commended for the admirable selection of the specimens of flax and hemp in different states of progress.

366. **Basil Maxinof, Zagorie, Kostroma, Russia.**

FLAX.

Report.—Commended for the very excellent quality of the collection of flax fibre.

367. **Roman Cartau, Pskof, Russia.**

FLAX.

Report.—Commended for the superior length and quality of the specimens of flax.

368. **Eugene Karamyshef, Torjok, Tver, Russia.**

HEMP AND FLAX.

Report.—Commended for the economy and adaptability of the flax and hemp fibres produced from ripe plants, with specimens of the plants in seed.

369. **Theodore Bykof, Vologda, Russia.**

FLAX PRODUCTS.

Report.—Commended for the great length and smoothness of fibre and strength and excellence of the flax yarns.

370. **Statistical Committee of Pskof, Russia.**

FLAX FIBRE.

Report.—Commended for the very large and admirable collection of the fibres of flax, raised on very poor and sandy soil, and showing all the steps of preparation previous to spinning; all of very superior quality.

371. **Manoel Ignacio Fernandes, Telloes, Villa Real, Portugal.**

FLAX FIBRES.

Report.—Commended for the fineness and softness of staple.

372. **Prince Nicholas Repnin, Poltava, Russia.**

FLAX FIBRES.

Report.—Commended for the very valuable and instructive collection of flax fibres, in different states of progress.

373. **Johann Narbuth, Vienna, Austria.**

HEMP FIBRES.

Report.—Commended for the excellent quality of the undressed retted and unretted hemp, and its adaptability for the purpose of cordage.

374. **Provincial Government of the Camarines, Philippine Islands.**

MANILA HEMP FIBRE.

Report.—Commended for great excellence in length, strength, and uniformity of fibre.

375. **Alfred Wishaw, St. Petersburg, Russia.**

FLAX FIBRES.

Report.—Commended for the large collection and excellent quality of the specimens of flax, grown in the extreme north of Russia.

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376. **Provincial Board of Agriculture, Castellon, Spain.**

HEMP FIBRE.

Report.—Commended for the excellence in quality of the samples of first and second quality dressed hemp.

---

377. **Valentin de la Cruz Carrascalejo, Caceres, Spain.**

FLAX FIBRE.

Report.—Commended for the excellence and usefulness of the dressed flax.

---

378. **Gent & Co., Pskof, Russia.**

FLAX.

Report.—Commended for the great strength and fineness of the flax.

---

379. **Victorino Teixeira da Costa Liberal, Mondim de Basto, Villa Real, Portugal.**

FLAX.

Report.—Commended for fineness and softness of the flax samples.

---

380. **Dutch Agricultural Society, Rotterdam, Netherlands.**

FLAX AND HEMP.

Report.—Commended for the excellence in quality and adaptability to purpose of the dressed flax and hemp.

---

381. **Agricultural and Forestry Union, Neustadtl, Moravia, Austria.**

FLAX AND TOW.

Report.—Dressed flax of various qualities, in all states of progress from the "hackle" to the "dressed line," prepared after the Belgian method.

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382. **Joaquim Augusto da Silveira Carvalho, Penafiel, Oporto, Portugal.**

FLAX.

Report.—Commended for excellence in length and softness of the flax fibre.

---

383. **Pedro Martins, Vieira, Braga, Portugal.**

FLAX.

Report.—Commended for excellence in quality of sample of flax.

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384. **The Committee of Ponta Delgado, St. Michael, Azores Islands.**

FLAX AND FLAX YARNS.

Report.—Commended for the excellence of the samples of flax and brown and bleached linen yarns; and also the tow and yarns of the same.

385. **L. Kluftinger, Bologna, Italy.**

HEMP.

Report.—Commended for the very great variety and excellence of the collection of dressed hemp, fibre of extraordinary fineness.

---

386. **Provincial Government of Laguna, Philippine Islands.**

MANILA HEMP.

Report.—Commended for excellent quality in length, strength, and evenness of fibre.

---

387. **Provincial Government of Albay, Philippine Islands.**

MANILA HEMP.

Report.—Commended for the great excellence of the Manila hemp in length, strength, and evenness of fibre.

---

388. **Jose de Segueira Pinto Queiroz, Vianno do Castello, Portugal.**

FLAX.

Report.—Commended for the excellence of staple.

---

389. **Anacleto da Fonseca Motta, Sardoal, Santarem, Portugal.**

HEMP.

Report.—Commended for excellence in length and fineness.

---

390. **John Fornara & Co., Lingotto, Turin, Italy.**

WIRE CLOTH.

Report.—Commended for the great variety and general excellence of the samples of wire cloth, ranging from very coarse, for fencing purposes, to fine wire gauze.

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391. **Barnard, Bishop, & Barnards, Norwich, England.**

WIRE FENCING.

Report.—Commended for excellence in diagonal weaving in a low-priced fabric. Principal merit, economy and adaptation to general use.

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392. **Louis Herrmann, Jr., Dresden, Germany.**

WIRE GOODS, WOVEN, 2½ INCHES TO ⅜.

Report.—Commended for special adaptability to wire screens in jails, out-houses, lawn fencing, for safety and ornament; also wire screens for sand, gravel, and general purposes in manufactories.

---

393. **Ph. J. Schöller & Sons, Neustadt-on-the-Haardt, Germany.**

WIRE CLOTH, DOUBLE TWILLED.

Report.—Commended for utility, especially in sifting potato-meal, sugar, starch, and all meals of that description.

394. **N. Greening & Sons, Warrington, England.**

WOVEN WIRE.

Report.—Commended for excellence in material, regularity of meshes, smoothness of wire, strength of fabric; very wide in heavy wire-woven fabrics.

General purposes; malt-kilns; rice and flour mills; general mining purposes.

---

395. **J. B. Brown & Co., London, England.**

GALVANIZED WIRE NETTING FOR INCLOSING POULTRY, PHEASANTS, DOGS, ETC.

Report.—Commended for excellence in assortment, from four-inch to half-inch meshes, material, workmanship, economy, regularity of meshes, quality, and manner of galvanizing.

---

396. **Pennsylvania Wire Works, E. Darby & Son, Philadelphia, Pa., U. S.**

WIRE GOODS IN VARIETY AND NOVELTY.

Report.—Novelties in trellises, bird cages, flower stands, and cases; garden fencing: Commended for general excellence in design, material, and manufacture.

---

397. **J. Andersson, Kjardingagarde, Gnosjo, Sweden.**

(A peasant, making the goods by hand.)

WIRE AND SIEVE CLOTH.

Report.—Very deserving; commended for excellence in plainness, economy, and strength.

---

398. **The Sellers Manufacturing Co., Philadelphia, Pa., U. S.**

WIRE CLOTH FOR PAPER MACHINES.

Report.—Commended for excellence in quality of material and workmanship; very heavy and flexible: seventy-two inches wide, thirty-six feet long.

---

399. **Clinton Wire Cloth Co., Clinton, Mass., U. S.**

WIRE FIRE-PROOF LATHING, FENCING, AND SCREENS.

Report.—Commended for excellence of workmanship, utility, and strength: especial note taken of the wire lathing, as a means of protection from fire.

---

400. **The Woven Wire Mattress Co., Hartford, Conn., U. S.**

WIRE MATTRESS.

Report.—Commended for excellence, strength, peculiar weaving, adaptation, economy, great durability, novelty of production.

---

401. **G. De Witt, Brother, & Co., Belleville, N. J., U. S.**

VENTILATED ELASTIC BREAST PADS, FINE BRASS WIRE THREAD, AND FINE WIRE CLOTH.

Report.—Commended for excellence in material, flexibility in the combination of brass wire and cotton threads, utility, and economy. One coil brass wire, five miles long, weighs one pound; wire cloth 10,000 (ten thousand) holes or meshes per square inch.

---

402. **John G. Avery, Worcester, Mass., U. S.**

THREAD, TWINE, AND CORD MACHINERY.

Report.—Commended for originality, perfection, and utility of machinery, fitness for the purposes intended, quality of products, and economy of working.

403. **William Crabb, Newark, N. J., U. S.**

HACKLES, CARD CLOTHING, WOOL COMBS, PICKER TEETH, COMB PINS, AND GILLS.

Report.—Commended for superior quality and utility of all the numerous articles exhibited, and fitness for their respective purposes.

---

404. **Fairbairn, Kennedy, & Naylor, Leeds, England.**

MACHINERY FOR PREPARING AND SPINNING JUTE, ETC.

Report.—Commended for excellence in design, arrangement, and construction of the machines, and for the quality and economy of their productions.

---

405. **Samuel Lawson & Sons, Hope Foundry, Leeds, England.**

MACHINERY FOR CORDING, PREPARING, AND SPINNING JUTE, ETC.

Report.—Commended for excellence in design, arrangement, and construction, and smoothness in working, of the machines, resulting in superior and economical production.

---

406. **Howard & Bullough, Accrington, England.**

CARDING ENGINE, DRAWING FRAME, AND INTERMEDIATE ROVING FRAME.

Report.—Commended for the very great novelty and originality of the electric stop-motion, which overcomes one of the most serious difficulties incident to the intermediate roving frame, and is also of great value as applied to the card and drawing frame; and for good workmanship and excellence of machines.

---

407. **Thomas Gadd, Manchester, England.**

EIGHT-COLOR CALICO PRINTING MACHINE AND STEAM ENGINE; ALSO ROLLER ENGRAVING MACHINERY.

Report.—Commended for great excellence in design, arrangement, and construction, fitness for the purposes intended, economy, and adaptation to public wants.

---

408. **J. A. V. Smith, Manchester, N. H., U. S.**

TUBULAR STEEL SPEEDER FLIERS.

Report.—Commended for lightness, strength, quality, and fitness of the fliers to the purposes intended, and saving of power.

---

409. **Providence Machine Co., Providence, R. I., U. S.**

SLUBBING, INTERMEDIATE, AND FINE COTTON ROVING FRAME.

Report.—Commended for good workmanship and quality of machines, and for the superior work produced by them.

---

410. **Greenwood & Batley (Albion Works), Leeds, England.**

MACHINE TO TIE IN WARPS FOR LOOMS.

Report.—Commended for originality of invention, of construction, and of exhibition, combined with utility, quality, skill, and superior workmanship. The object sought, to tie automatically instead of by hand, is completely achieved.

411. **Platt Brothers & Co. (Limited), Oldham, England.**

LONG STAPLE COTTON GIN.

Report.—Commended for originality of invention, perfection in construction, and adaptation to public wants in ginning of long staple cotton or "sea-island cotton." It ginned in presence of the Judges in thirty minutes 247½ pounds of sea-island *long* staple *seed cotton* (or equal to the capacity of about a 25-saw gin on *short* staple cotton) without injury to the lint, requiring about one-half the power of the saw gin, the work being perfectly done.

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412. **William T. Horrobin, Cohoes, N. Y., U. S.**

ANTI-FRICTION TOP ROLLERS.

Report.—Commended for excellent quality and fitness for the intended purpose, with economy of cost and use.

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413. **Lewiston Machine Co., Lewiston, Me., U. S.**

THOMAS'S POWER LOOMS AND WARPING MACHINE.

Report.—Commended for ingenuity, skill, quality, economy, and fitness of machines for the production of plain and fancy fabrics and seamless bags.

---

414. **Eaton & Ayer, Nashua, N. H., U. S.**

BOBBINS, SPOOLS, SHUTTLES, AND SKEWERS FOR SPINNING AND WEAVING.

Report.—Commended for good quality and workmanship. There are also features of novelty and utility in the self-threading shuttles, and in the iron rings applied to spinning bobbins, for the Sawyer and Rabbeth spindles; and also to roving bobbins.

---

415. **A. B. Prouty, Worcester, Mass., U. S.**

CARD SETTING MACHINE.

Report.—Commended because the machine possesses the important features of novelty and utility, combined with simplicity of arrangement and action and excellent construction. The work produced is superior in quality and economical in cost.

---

416. **The Dutcher Temple Co., Hopedale, Mass., U. S.**

POWER LOOM TEMPLES.

Report.—Commended for excellent quality and eminent fitness for the intended purpose.

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417. **Saco Water-Power Machine Shop, Biddeford, Me., U. S.**

MULE SPINNING, DRAWING, AND ROVING MACHINES.

Report.—Commended for originality, utility, and excellent quality of the machines, and for the great consideration given to the details.

---

418. **Geo. Draper & Son, Hopedale, Mass., U. S.**

SPINNING FRAME AND TWISTER WITH THE SAWYER SPINDLE; IMPROVED SPOOLS, WARPER, AND CREEL; SPINDLE; DOUBLE ADJUSTABLE RINGS.

Report.—Commended for variety of machines, with originality of invention, excellence in quality, utility, and fitness for the purpose intended, economy of power and labor, and excellence of work produced.

419. Clark Thread Co., Newark, N. J., U. S.

SELF-ACTING MULTI-SPOOL WINDING MACHINE FOR SPOOLING THREAD AND COTTON.

Report.—Commended for originality and excellence of invention, fitness for the purpose intended, good construction, and accurate working of machine, resulting in a superior quality and great economy of winding.

---

420. Fales & Jenks Machine Co., Pawtucket, R. I., U. S.

MAYOR'S COMBINED FLY FRAME AND SPEEDER.

Report.—Commended for good substantial machinery, novelty of details and action, utility, fitness for the purpose intended, economy, and quality of work produced.

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421. Knowles & Brother, Worcester, Mass., U. S.

OPEN SHED FANCY LOOMS, FOR COTTON, WOOL, AND SILK.

Report.—Commended for originality of invention, substantial and good construction of machinery, smoothness of working, facility for effecting changes and for manipulating, economy, quality and variety of work produced.

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422. David McFarland, Worcester, Mass., U. S.

CARD SETTING MACHINE.

Report.—Commended for simplicity and excellence of machine, and for the good quality and economy of the work done by it.

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423. H. W. Butterworth & Sons, Philadelphia, Pa., U. S.

DRYING MACHINES FOR COTTON FABRICS, AND DYEING MACHINES FOR COTTON WARPS.

Report.—Commended as excellent in design, arrangement, and construction, possessing features of novelty and utility, and fitness to the intended purposes.

---

424. Thomas Wood, Philadelphia, Pa., U. S.

POWER LOOMS AND WINDING MACHINE.

Report.—Commended for excellent construction, numerous features of novelty, simplicity, and utility, facility for working, economy of labor in attending, cheapness, and quality of work produced.

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425. Richard Kitson Machine Co., Lowell, Mass., U. S.

COTTON OPENERS AND LAPPERS AND SHODDY PICKER.

Report.—Commended for originality of invention in opener and in elastic beaters, as well as for general good workmanship and utility in all the machines.

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426. George Crompton, Worcester, Mass., U. S.

PLAIN AND FANCY POWER LOOMS FOR COTTON GOODS.

Report.—A large assortment of well designed and constructed looms, possessing great range and capacity for the manufacture of figured cotton fabrics.

---

427. Foss & Pevey, Lowell, Mass., U. S.

UNDER-FLAT COTTON CARD.

Report.—This machine has peculiarities of construction which are original.

428. **Merrick Thread Co., Holyoke, Mass., U. S.**

SEWING-MACHINE SHUTTLES.

Report.—Commended for the very ingenious device for saving labor in their "patent" ready-wound bobbins for use in sewing machines.

---

429. **Willimantic Linen Co., Hartford, Conn., U. S.**

SPOOL COTTON, FINE YARNS, AND MACHINES FOR WINDING AND TICKETING SPOOLS FOR SEWING-THREADS.

Report.—Commended for originality and completeness of system, excellence of machinery and appliances, the winding-frame being the invention of Hezekiah Conant; and for superiority and economy of production; also for excellence of material and variety of colors of threads.

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430. **Hope & Co., Providence, R. I., U. S.**

PENTAGRAPH ENGRAVING MACHINE FOR CALICO PRINTERS.

Report.—Commended for novelty in some of the details, and altogether beautifully and accurately made.

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431. **Peter Lawson, Lowell, Mass., U. S.**

IMPROVED COMPOSITION DRAWING OR ROVING CAN.

Report.—Commended for lightness, strength, handiness, and cheapness, as compared with the ordinary can.

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432. **J. & W. Lyall, New York, N. Y., U. S.**

POSITIVE-MOTION LOOMS, FOR CORSETS, CANVAS, SEAMLESS BAGS, JUTE CARPETS, COTTON SHEETING, ETC.

Report.—Commended for the variety, extent, and importance of the looms, invention of the positive motion, its wide range of applicability, fitness for the purposes intended, excellence of design, construction, and working, utility, and economy.

---

433. **Palmer Patent Tentering & Drying Machine Co., Norwich, Conn., U. S.**

MACHINE FOR STRETCHING, STRAIGHTENING, AND DRYING TEXTILE FARBICS.

Report.—Commended for originality, utility, and completeness of machine, excellence of construction, fitness for the purposes intended, adaptation to public requirements, and economy.

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434. **J. Morton Poole & Co., Wilmington, Del., U. S.**

CALENDER ROLLS.

Report.—Commended for the excellent finish, beauty of the articles exhibited, as well as the superior quality of the material.

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435. **R. D. Wood & Sons, Millville, N. J., U. S.**

CALENDER FOR COTTON GOODS.

Report.—Commended for good workmanship, material, and fitness for the intended purpose.

436. **S. N. Drake, New Orleans, La., U. S.**

DRAKE'S PATENT COTTON TIES.

Report.—Commended for the simplicity, effectiveness, and applicability to purpose, of the hoop-iron stamped and slotted ties for baling cotton.

---

437. **Peabody Mills, Providence, R. I., U. S.**

COLORED COTTON GOODS, PRINTS, AND COLORED SUITINGS.

Report.—Commended for superiority of fabric, smoothness, economy, and adaptation; colors clear and well defined, and in very large variety. Also for non-fading qualities of colors.

SIGNING JUDGES OF GROUP VIII.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

ISAAC WATTS, 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 53, 54, 64, 65, 67, 71, 72, 73, 74, 117, 200, 207, 208, 211, 215, 224, 228, 234, 235, 236, 237, 252, 253, 327, 328.

SAMUEL WEBBER, 5, 32, 33, 34, 35, 36, 38, 39, 40, 41, 42, 43, 45, 46, 49, 50, 51, 52, 56, 57, 58, 59, 61, 69, 80, 84, 85, 86, 87, 90, 91, 92, 93, 96, 98, 99, 100, 103, 104, 105, 106, 107, 109, 110, 112, 113, 114, 115, 116, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 135, 136, 137, 138, 139, 140, 142, 153, 154, 155, 156, 157, 158, 159, 161, 165, 167, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 205, 206, 212, 214, 220, 221, 223, 225, 226, 227, 229, 230, 231, 238, 239, 258, 259, 260, 261, 262, 263, 264, 269, 270, 271, 272, 273, 274, 275, 277, 278, 279, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 325, 326, 331, 335, 337, 338, 339, 353, 354, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 406, 426, 434, 435, 436.

E. RICHARDSON, 37, 47, 48, 55, 68, 70, 160, 162, 163, 166, 340, 341, 342, 343, 348.

EDWARD ATKINSON, 44, 164, 210, 276, 333, 428.

CHAS. H. WOLFF, 60, 66, 75, 76, 77, 78, 79, 81, 82, 83, 88, 89, 95, 97, 101, 108, 111, 129, 130, 131, 132, 133, 134, 141, 147, 148, 149, 150, 151, 152, 222, 233, 242, 246, 247, 248, 249, 251, 280, 281, 324, 329, 330, 332, 334, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 437.

A. GOLDY, 62, 63, 94, 102, 143, 144, 145, 146, 168, 169, 201, 202, 203, 204, 209, 213, 232, 243, 244, 245, 250, 254, 255, 256, 257, 265, 266, 267, 268, 293, 294, 295, 296, 297, 323, 350, 351, 352, 355, 356, 357.

GUSTAV HERRMANN, 216, 217, 218, 219, 241, 403, 404, 405, 407, 409, 410, 412, 413, 417, 418, 420, 422.

WILLIAM W. HULSE, 240, 402, 408, 414, 415, 416, 419, 420, 421, 423, 424, 427, 430, 431, 432, 433.

GEO. O. BAKER, 336, 345, 346, 347, 349, 411.

H. WADDELL, JR., 344.

A. D. LOCKWOOD, 425, 429.

SUPPLEMENT TO GROUP VIII.

REPORTS

OF

JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.
COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

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1. R. T. White & Son, Philadelphia, Pa., U. S.

CARPET WARPS.

Report.—Commended for general good quality.

---

2. Parrish & Miller, Jefferson, Marion Co., Oregon, U. S.

FLAX IN THE STRAW AND LINT.

Report.—Commended for extraordinary length, great strength, superior gloss, and silky softness.

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3. Westbrook Manufacturing Co., Portland, Me., U. S.

COTTON DUCK.

Report.—Commended for great excellence in texture and uniform good finish.

---

4. The Utica Steam Cotton Mills, Utica, N. Y., U. S.

COTTON SHEETINGS AND SHIRTINGS, UNBLEACHED AND BLEACHED.

Report.—Commended as a fabric in various widths of great excellence in texture and general finish.

---

5. Albion Print Works, Conshohocken, Pa., U. S.

DYEING AND PRINTING.

Report.—Commended for great variety of colors and excellence of dyeing and finishing both in solid colors and plain black for suitings.

6. **Farwell Mills, Lisbon, Me., U. S.**

BLEACHED AND UNBLEACHED COTTON, SHEETINGS AND SHIRTINGS.

Report.—For uniform texture and excellent finish.

---

7. **Clariana Ciuro Augé & Co., Granollers, Barcelona, Spain.**

COTTON PLAIDS.

Report.—Commended for enonomy in cost and fitness for purpose intended.

---

8. **Angus Mackay, Queensland, Australia.**

RAW COTTON.

Report.—An exhibit of cotton grown from American seed, cultivated by himself, of excellent quality.

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9. **E. Ashworth & Sons, Bolton, England.**

COTTON THREADS AND YARNS.

Report.—A good exhibit, especially in three, six, and nine ply on spools, showing great excellence in strength and finish.

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10. **McTear & Co., Belfast, Ireland.**

SHIP SHEATHING OF JUTE FELT IN BOTH VEGETABLE AND COAL TAR; BOILER FELTING.

Report.—Commended for good quality of material and workmanship.

---

11. **Frederick Facchini di Cesare, Bologna, Italy.**

HEMP IN BRAIDS AND TWISTED.

Report.—Commended for superior quality for wearing purposes and adaptation to purpose intended.

SIGNING JUDGES OF SUPPLEMENT TO GROUP VIII.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

B. F. BRITTON, 1, 3, 4, 5, 6, 7, 8, 9.
M. WILKINS, 2.
COLEMAN SELLERS, 10.
HENRY H. SMITH, 11.

United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP IX.

EDITED BY
FRANCIS A. WALKER,
CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1877.

Entered, according to Act of Congress, in the year 1876, by the
CENTENNIAL BOARD OF FINANCE,
In the Office of the Librarian of Congress at Washington.

SYSTEM OF AWARDS

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

* * * * * * * * * * *

Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respectively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP IX.

JUDGES.

AMERICAN.	FOREIGN.
JOHN L. HAYES, Cambridge, Mass.	GUSTAV GEBHARD, Germany.
ELLIOT C. COWDIN, New York.	THEODORE BOCHNER, JR., Austria.
CHARLES LE BOUTILLIER, Philadelphia, Pa.	HENRY MITCHELL, Great Britain.
CHARLES J. ELLIS, Philadelphia, Pa.	MAX WEIGERT, Germany.
J. D. LANG, Vassalboro', Maine.	LOUIS CHATEL, France.
	CARL ARNBERG, Sweden.
	HAYAMI KENZO, Japan.
	JOHN G. NEESER, Switzerland.
	AUGUST BEHMER, Egypt.
	ALBERT DANINOS, Turkey.

EDWARD H. KNIGHT was temporarily assigned from Group XXII to assist in examinations of heddles.

GROUP IX.

WOOL AND SILK FABRICS, INCLUDING THE MATERIALS AND THE MACHINERY.

WOVEN AND FELTED GOODS OF WOOL, AND MIXTURES OF WOOL.

CLASS 667.—Wool in the fleece, in bales, and carded.

CLASS 235.—Card wool fabrics,—yarns, broadcloth, doeskins, fancy cassimeres. Felted goods. Hat bodies.

CLASS 236.—Flannels,—plain flannels, domets, opera and fancy.

CLASS 237.—Blankets, robes, and shawls.

CLASS 238.—Combed wool fabrics,—worsteds, yarns, dress goods for women's wear, delaines, serges, poplins, merinoes.

CLASS 239.—Carpets, rugs, etc.,—Brussels, Melton, tapestry, tapestry Brussels, Axminster, Venetian, ingrain, felted carpetings, druggets, rugs, etc.

CLASS 240.—Hair,—alpaca, goat's hair, camel's hair, and other fabrics mixed or unmixed with wool.

CLASS 241.—Printed and embossed woolen cloths, table covers, patent velvets.

CLASS 522.—Machines for the manufacture of woolen goods.

SILK AND SILK FABRICS, AND MIXTURES IN WHICH SILK IS THE PREDOMINATING MATERIAL.

CLASS 242.—Cocoons and raw silk as reeled from the cocoon; thrown or twisted silks in the gum.

CLASS 243.—Thrown or twisted silks, boiled off or dyed; in hanks, skeins, or on spools.

CLASS 244.—Spun silk yarns and fabrics, and the materials from which they are made.

CLASS 245.—Plain woven silks, lutestrings, sarsenets, satins, serges, foulards, tissues for hat and millinery purposes, etc.

CLASS 246.—Figured silk piece goods, woven or printed. Upholstery silks, etc.

CLASS 247.—Crapes, velvets, gauzes, cravats, handkerchiefs, hosiery, knit goods, laces, scarfs, ties, veils, all descriptions of cut and made-up silks.

CLASS 248.—Ribbons,—plain, fancy, and velvet.

CLASS 249.—Bindings,—braids, cords, galloons, ladies' dress trimmings, upholsters', tailors', military, and miscellaneous trimmings.

CLASS 520.—Machines for the manufacture of silk goods.

GENERAL REPORT

OF THE

JUDGES OF GROUP IX.

PHILADELPHIA, December, 1876.

PROF. FRANCIS A. WALKER, *Chief of the Bureau of Awards:*

SIR,—In pursuance of instructions from your Bureau, that each group of Judges should submit a report exhibiting a survey of the Exhibition in their particular department, embodying the instructive facts observed and conclusions suggested in their examination, the Judges of Group IX. have authorized the undersigned to present the results of their examination. In the consultations upon the awards to exhibitors, among the members of this group, who represented ten different nationalities, all national distinctions were ignored, and so full was the interchange of opinion among the Judges, and so absolute the harmony of sentiment, that an individual member of the group can hardly fail to express the common opinion.

Respectfully submitted,

JOHN L. HAYES.

GROUP IX.

WOOL AND SILK FABRICS.

CLASS 667.—Wool in the Fleece, in Bales, and Carded.

Leading all nations in the supply of this material, the group of British colonies in the Southern Hemisphere, known as Australia, makes itself most conspicuous. The colonies of New South Wales, Victoria, South Australia, Queensland, Tasmania, Western Australia, and New Zealand, although separate political organizations, exhibit so marked a nationality in this common production, that we are compelled to consider them as one.

Foreign Judges, who were familiar with the great European Expositions, concur in pronouncing the exhibition of wools by Australia at the International Exhibition of 1876 as surpassing any ever before made. The colonies vied with one another in making their exhibits upon a scale proportionate to their vast power of production. Thus the wools of each exhibitor were shown in bales, in numerous fleeces, and illustrative samples, as produced from ewes, rams, hoggets, and lambs, as unwashed, cold-washed, and hot-water-washed, and as adapted for combing or for clothing purposes. Of course, the characteristic feature of the display was the capacity of Australia for the culture of wool of the Merino breed, adapted to the present exigencies of the manufacturing nations, for the exhibition of wool of other breeds by Australia was comparatively unimportant. The fibre of this breed was shown here in the utmost perfection, both in staple and condition, for all ordinary purposes of manufacture, with a production already of great proportions, yet constantly enlarging. When we consider the wide adaptation of this fibre to the uses both of luxury and necessity, and remember that it was for centuries the monopoly of a single nation, refused even to its colonies; that when Spain relaxed her monopoly, scarcely over a century ago, it was only in favor of the kings of Europe; and that the Merinos procured from Spain by George III., in 1792, in exchange for eight carriage-horses,

were literally the direct source of the Australian wool-husbandry, we must regard the Australian exhibit as one of the most striking illustrations of the world's acquisitions within the last century.

The only deficiency attending this exhibit—one which the high culture and science of these colonies might have easily supplied—was the want of systematized information as to the statistics of wool-production and sheep-husbandry, the methods of improvement, and the details which would be interesting to the practical shepherd. This deficiency, in some respect supplied by the several Commissioners, and by personal inquiries and reference to trustworthy authorities, forbids the fullness of information in this report which the importance of the Australian wool-production demands.

The number of sheep in Australia, according to the latest returns, is stated in the following communications:

"ST. GEORGE'S HOUSE, FAIRMOUNT PARK,
"PHILADELPHIA, September 2, 1876.

"SIR,—With reference to your letter of the 28th ultimo, I beg to send you a copy of a letter which I have just received from Mr. Robinson, Secretary of the New South Wales Commission.

"I have the honor to be, sir, your obedient servant,

"A. J. R. TRENDELL.

"JOHN L. HAYES, ESQ., 11 Pemberton Square, Boston, Mass."

[Enclosure.—Copy.]

"PHILADELPHIA.

"SIR,—In reply to your letter of yesterday's date, covering a communication from Mr. Hayes, I have the honor to inform you that the number of sheep in the Australian colonies in the year 1874, the latest year for which I have statistics, was as follows:

"New South Wales	22,872,882
Victoria	11,225,206
South Australia	6,120,211
Queensland	7,268,946
Tasmania	1,714,168
Western Australia	777,861
New Zealand	11,704,853
	61,684,127

"The number at the present time would be very much larger, but I regret that I cannot inform Mr. Hayes what is the average rate of yearly increase. The production of wool may be arrived at on the basis of the average clip, which I believe to be 2¾ pounds of washed wool for each fleece. If Mr. Hayes consults the export returns of the different colonies, it may be important that he should know that

a large quantity of Queensland-grown wool is exported from Sydney, and that much of the wool grown in New South Wales is shipped from Victoria and South Australia, owing to their exceptional facilities for water and railroad carriage.

"The statistical returns of the different colonies would, without a knowledge of this fact, be very misleading, by the wool-production of Australia being made to appear vastly greater than it is in fact.

"I have the honor, etc.,

"CHAS. ROBINSON, *Secretary*,

"*New South Wales Commissioner.*"

The report of 1876, of H. Schwartz & Co., of London, very high authorities in wool statistics, states the exports of Australian wool in 1875–6 as follows:

Great Britain	771,786 bales.
United States	5,807 "
Continental Countries	2,414 "
Total	780,007 "

This amount, according to their estimates, is equal to 247,700,000 pounds.

The report for 1874, of Mr. Alexander Bruce, the chief inspector of live-stock in New South Wales, declared to be a high authority, gives the following instructive facts in relation to the sheep of that colony, and may be regarded as illustrative of all the colonies:

1. Number.—The number of sheep in the colony in 1874 was 20,709,338, and 22,767,416 in 1875, being an increase in 1875 of 2,058,078.

2. Combing and Clothing.—The returns give 6,100,000 combing sheep, and 5,490,000 clothing, while with respect to 6,420,000, it is not stated whether they are combing or clothing, and in many cases owners give no information.

3. Long-wooled and Cross-bred Sheep.—Of these some 125,000 are returned, and they are given as being of the following breeds: Leicesters, 15,881; Lincolns, 9771; Downs and other breeds, 37,583; and Cross-bred sheep, 62,242.

4. How kept.—In 395 cases sheep are returned as depastured in paddocks, in 504 as shepherded, in 88 as both in paddocks and shepherded, and in 381 cases no information is given on this point.

5. Improvement.—On 681 holdings the sheep are reported to be improving, on 43 as deteriorating, on 72 as stationary, and 548 owners make no returns.

6. Stud Sheep.—The returns show that of these sheep there were

23,412 introduced; of which 18,086 were Merinos, 343 Leicesters, 4741 Lincolns, and 42 Downs.

7. Fencing.—It has proved advantageous to inclose flocks within fences on the following accounts: *a.* Improvement.—(1) In the health and soundness of the sheep; (2) in their size and stamina; (3) in the quantity and quality of wool; (4) in the carrying capability of the holding. *b.* Saving.—(1) In expense of management; (2) in the losses arising from shepherding, especially from bad shepherds. *c.* Advantages to Owner.—It relieves him from the trouble of managing shepherds and hut-keepers, and allows him time to attend to the improvement of the breed of his sheep. *d.* General Benefit.—This is stated by owners to be an increase of the value of a run of from 20 to 60 per cent.

8. Lambing.—The general average of shepherded flocks was 72¼ per cent.; of paddocked sheep 75 per cent.; and of sheep depastured both ways 74¾ per cent.

9. Clip.—The yield of wool per sheep, in 1874, was as follows:

	lbs.	ozs.
Greasy.		
The average clip of greasy wool in shepherded sheep was	4	$3\frac{4}{10}$
" " " paddocked sheep was	4	$15\frac{2}{10}$
" " " both	4	$10\frac{7}{10}$
Creek-washed.		
The average clip of shepnerded sheep was	2	$12\frac{8}{16}$
" " " paddocked	3	$4\frac{2}{10}$
" " " both	2	$12\frac{4}{10}$
Hot-water-washed.		
The average clip of shepherded sheep was	2	$8\frac{2}{10}$
" " " paddocked	3	2
" " " both	2	$11\frac{4}{10}$
Scoured.		
The average clip of shepherded sheep was	2	$2\frac{2}{10}$
" " " paddocked	2	8
" " " both	2	10

10. Difference in Weight between Combing and Clothing.—On this point 1238 owners give no information, 75 "cannot say," 4 report that there is no difference, 32 that there is a slight difference in favor of combing; 4 put the difference at 8 ounces, 2 at 12 ounces, 1 at 16 ounces, 4 more at more than 16 ounces, and 6 state that combing is the more profitable.

The important facts presented by this statement are, that more than half the sheep produce combing wool; the respective weights of the

greasy, creek-washed, hot-water-washed, and scoured wools; and the positive testimony, which should be specially noted by the California wool-growers, as to the advantages of fencing sheep. It is obvious that this must depend somewhat upon the nature of the feed and general custom of the country, and still more upon whether the flock-masters own the land or pasture at large. In this connection it may be noted that Mr. Bruce elsewhere states that the fence most approved for sheep and cattle is a fence with split posts, one split top-rail, and five wires.

SOUTH AUSTRALIAN WOOL.

The following communication from the Commissioner of another colony, South Australia, gives interesting facts as to the weight of fleeces and extent of the flocks of individual flock-masters:

"PHILADELPHIA,
"MAIN BUILDING, 8th June, 1876.

"TO THE JUDGES OF WOOL, *International Exhibition, 1876:*

"GENTLEMEN,—As Commissioner for South Australia, I have the honor to subjoin a statement of the weight of fleeces of wool examined by you in this court; taking first a copy of the declared weights of some wool in bales seen by you, and of which you have the growers' names, and then appending the weights of fleeces you desired should be weighed in the Main Building.

"1st. *Declared Weights of Wool exhibited all Unwashed.*

"MOORAK WOOL. (W. T. Brown.)

No. of Bales and Classes of Sheep.	Contents in Fleeces.	Average Weight of Fleece. lbs.	ozs.	dwt.	Age of Sheep.
No. 1. Ewes	14	7	9	$2\frac{4}{14}$	3 years.
" 2. Hoggets	15	7	3	$3\frac{8}{15}$	18 mos.
" 3. Lambs	20	2	12	$12\frac{1}{20}$	4 "
" 4. Wethers	15	7	6	$6\frac{8}{18}$	2 years.

"N.B.—40,000 sheep are pastured at Moorak.

"WONOKA WOOL. (Hayward, Armstrong, & Co.)

No. of Bales and Classes of Sheep.	Contents in Fleeces.	Average Weight of Fleece. lbs.	ozs.	dwt.	Age of Sheep.
No. 1. Ewes	14	7	1	$2\frac{4}{18}$	3 years.
" 2. Hoggets	13	7	4	$14\frac{11}{11}$	18 mos.
" 3. Lambs	20	3	11	$3\frac{8}{20}$	5 "
" 4. Wethers	12	8			3 years.

"WELPENA WOOL. (Price & Browne.)

No. of Bales and Classes of Sheep.	Contents in Fleeces.	Average Weight of Fleece. lbs.	ozs.	dwt.	Age of Sheep.
No. 1. Ewes	11	7	11	$3\frac{2}{20}$	3 years.
" 2. Hoggets	12	7	5	$5\frac{4}{12}$	18 mos.
" 3. Wethers	10	8	11	$3\frac{2}{20}$	3 years.
" 4. Lambs	16	3	7		5 mos.

"J. KEYNES WOOL.

No. of Bales and Class of Sheep.	Contents in Fleeces.	Average Weight of Fleece. lbs.	ozs.	dwt.	Age of Sheep.
No. 1. Wethers	15	9	...	...	4 teeth.

"N.B.—13,000 sheep are kept by Mr. Keynes.

"ALLAN MCFARLANE WOOL (MF).

No. of Bales and Class of Sheep.	Contents in Fleeces.	Average Weight of Fleece. lbs. ozs. dwt.	Age of Sheep.
No. 1. Ewe, with lamb	15	6 well sorted.	3 years.

"N.B.—15,500 sheep are kept by Mr. McFarlane.

"COLLINGROVE WOOL. (J. H. Augas.)

No. of Bales and Classes of Sheep.	Contents in Fleeces.	Average Weight of Fleece. lbs.	ozs.	dwt.	Age of Sheep.
No. 1. Ewes	Not stated.	6	1	0	2 teeth.
" 2. Ewe Hoggets	25	7	$10\frac{1}{4}$	...	2 and 4 teeth.
" 3. Wet Ewes	Not given.	Not given.			4 and 5 "
" 4. Lambs	"	"			Not given.
" 5. Lambs	"	"			"

"2d. *Weights of Fleeces weighed in the Building, as requested.*

"Fleeces exhibited by J. Keynes. (Merino Wool.)

Fleece 1 weighs	11 lbs.	6 ozs.	0 dwt.
" 2 "	10 "	12 "	11 "
" 3 "	10 "	11 "	8 "
" 4 "	12 "	7 "	8 "

"Fleeces exhibited by J. Murray. (Merino Wool.)

No. 1 weighs	12 lbs.	11 ozs.	8 dwt.
" 2 "	12 "	2 "	8 "
" 3 "	15 "	11 "	0 "
" 4 "	14 "	5 "	0 "
" 5 "	15 "	13 "	0 "
" 6 "	15 "	3 "	8 "

"Fleeces exhibited by Thos. Graham. (Mixed, Lincoln and Leicester.)

No. 1 weighs	13 lbs.	11 ozs.	0 dwt.
" 2 "	11 "	6 "	12 "

No. 3 weighs	11 lbs.	15 ozs.	0 dwt.
" 4 "	12 "	9 "	8 "
" 5 "	10 "	2 "	0 "
" 6 "	13 "	3 "	0 "

"I have the honor to be your obedient servant,

"SAM. DAVENPORT,

"*Special Commissioner for South Australia.*"

A brief review of the methods by which the Australian sheep-husbandry has reached its present commanding position, with a presentation of some of the instructive facts in relation to the Merino culture drawn from Australian experience, is justified by the importance of the subject. The principal sources of this review are responses to personal inquiries, or information obtained from or confirmed by the respective colonial Commissioners. Of the works having this sanction, the most important are Mr. Graham's treatise on the *Australian Merino* and the *New South Wales Wool Inquiry*, published in 1871 by the Agricultural Society of New South Wales.

Captain John McArthur, an officer of the British army, who had landed at Sydney in 1790, just two years after it had been formed into a penal settlement, was the first to observe that the fleeces of the hairy Bengal sheep, brought from the Cape of Good Hope, had in some way become sensibly improved. Conceiving the idea that the soil and climate of the settlement were peculiarly adapted for the production of fleeces of the best quality, he induced the importation of a small flock of Merino sheep which had been sent to the Cape of Good Hope by the Dutch Government. In 1803 he took with him to England samples of wool from the crosses which he had made of coarse-wooled ewes with Spanish rams. At that period all the fine cloths of England were made of wool imported from Spain. Fortunately, Captain McArthur arrived in England at a time when the English manufacturers were alarmed lest their wool-supply from Spain should be cut off by a threatened war. Through the influence of these manufacturers Captain McArthur secured assent from the British Secretary of State for the Colonies to his application for a grant of ten thousand acres of land in New South Wales for carrying on the growth of fine wool for export. He also obtained a few Spanish Merinos from the royal flock of George III., these Merinos being the "twin Cabana with the French Imperial Cabana Rambouillet." Having arrived in the colony with his chosen flock, which was placed upon the tract of land secured by his grant, he commenced the reclamation of his estate and the creation of fine-wool flocks, through the persistent use of the George III. rams upon so sorry a lot

of sheep that "long years were taken to eliminate the bad qualities of the pristine animals, on which he bred." For years the only efforts for improvement were made by himself, and so slow was his progress "that it took some twenty-three years" to perfect the pure breed of Australian Merinos. In 1810 the exportation was only 167 pounds; in 1820, 99,415; in 1826, 806,302 pounds. The best growers in the colony "bred from McArthur ewes." "From about 1829 to 1840," says Mr. Graham, "the Australian wool had a character so uniform and fixed that an English wool-broker or sorter could with certainty select by the touch alone, from a bale of others, a Botany Bay fleece, as they were called." The sheep, however, were small, the ewes weighing not more than 30 to 34 pounds each, and the wool wanting in denseness, the animals being bred mainly for fineness, in which they excelled. Smallness of size still appears to be the general character of Australian sheep, as shown by the average yield of unwashed wool per sheep in New South Wales,—4 pounds 9 ounces. After the time of Mr. McArthur, who died in 1834, many breeders, by selecting the largest and best-wooled sheep to breed from every year, and by keeping their runs understocked, or by liberal feeding, imparted size and density of fleece to the Australian Merinos, the ewes of some flocks attaining an average weight of 70 pounds.

After 1835, stud sheep were largely imported from abroad; and attempts were made to improve the Australian Merinos by crosses of the English races,—the Leicesters, Lincolns, and Downs,—not only with signal failure, but with incalculable injury to the most of the Merinos.

The Rambouillet sheep were also largely introduced, but without benefit, in the opinion of Mr. Graham, because without artificial sustenance they were too large for the country. The German sheep, imported at great expense, produced no benefit either in quality of wool or weight of fleece. Recently, Vermont sheep have been introduced, and Mr. Graham says, "of all imported sheep those of our first cousins, the Americans, are the best."

The results of Australian experience would seem to show that climate has less to do with the excellence of Merino wools than is commonly supposed. The "Salt-bush" country (a region of excessive heat) can, and does in some instances, produce as heavy or valuable wool as do any other portions of the colonies; and wool of the Darling Downs within the tropics, grown by a careful and judicious system of selection, is unexceptionable, although known as a "hot country wool." Still, Australia confirms the theory of scientific writers, that the natural region for Merino sheep is the region of the

vine, for the excellent wines of these colonies were among the most characteristic of their productions shown at the Exhibition.

Another lesson taught by the Australian sheep-husbandry, and confirmed by notes taken at the Exhibition, is the advantage of close breeding. Mr. Graham says that for a period of twenty-five years he was engaged in testing the value of in-and-in breeding. By in-breeding he does not mean indiscriminate breeding without selection, but, on the contrary, breeding with judicious selection,—that is, rejecting the faulty sheep, male and female, and breeding only from the perfect. With this qualification, he remarks, "I say that I never saw an entire flock of really good sheep that was not wholly composed of in-bred animals, and I think it scarcely possible to breed good sheep without having recourse to in-breeding."

It was interesting to observe that these views were confirmed by memoranda attached to Australian fleeces displayed at the Exhibition; memoranda made, of course, without reference to any theory of breeding. Some of these memoranda were as follows:

"Gore & Co., Yandella, Queensland. Combing ewe, bred pure within their own flocks for 21 years; bred in paddocks entirely on indigenous grasses."

"C. B. Fisher, East Haddington Hill, Darling Downs District, Queensland. This clip has been bred in Adelaide, South Australia, 40 years in-and-in to their own blood, and has been acclimated in Queensland 7 years; pronounced by Chamber of Commerce to be the most essentially combing wool."

"George Clark, Queensland. Sheep improved by Tasmanian Merinos bred pure for more than 50 years."

"C. H. Grison, Queensland. Bred within their own blood many years. Undoubtedly one object of this close-breeding with large flock-masters is to preserve the special characteristics of the wool approved by their old controversies."

It is well known that so uniform are the characteristics in certain flocks, and so high the probity of the growers, that the clips of some proprietors are purchased by the same customers from year to year almost without testing. This uniformity and reliability is one of the great advantages to the manufacturer of having sheep-husbandry pursued on a large scale. He may select from one or two clips with certainty the precise wools adapted to his fabrics. This advantage has already been perceived in purchases from California, where wool-growing in large flocks has begun to be pursued by capitalists, as in Australia, systematically.

Sheep-husbandry being—not even excepting the gold-mining inter-

ests—of the first importance in the Australian colonies, is pursued by capitalists and men of intelligence. Relieved, as the proprietors are, from an expense of northern climates,—that of providing shelter and stores of winter fodder; winter production not being required, and the indigenous grasses being nutritious even when dried,—the principal outlay required in addition to that for stock is for providing an uninterrupted supply of water. The destructive droughts of 1866 have led to provisions for this supply on the broadest scale. Precautionary measures have been taken over the length and breadth of Australia against the failure of water. At enormous expense, dry water-courses have been converted into permanent rivers, reservoirs and tanks have been constructed, wells have been dug and dams made, and the stations so provided with water as to prevent the recurrence of the catastrophe of 1866.

The expense of transportation to the very distant markets making the weight of the dirt and yolk of the wool a serious item, the washing of the wool on the sheep is conducted with a thoroughness nowhere else known. The washed wools, whether cold- or hot-water-washed, extensively exhibited at the Exhibition in bales and cases, could scarcely be distinguished from sound or absolutely clean wools.

Attention is given to every detail connected with the manufacture of wool, as in the shearing. The uniformity of the clipping in fleeces exhibited at the Exhibition, the steps usually made by the shears being scarcely visible, was the subject of favorable comment by our wool-growers; yet the price paid the shearers, reported in the official record of Victoria, is only 14 shillings 4 pence for every hundred animals shorn.

The *Wool Inquiry*, instituted by the Agricultural Society of New South Wales, is illustrative of the high intelligence with which the wool industry of the Australian colonies is pursued. The main subjects of the inquiry were, What descriptions of wool are now likely to be most in demand, and what are the best modes of preparing the wool and putting it in the market? Circulars containing interrogatories, all pertinent to the general question, were addressed to the most eminent wool houses and chambers of commerce of England. Full answers to these interrogatories by thoroughly-informed persons and commercial bodies in England are published in the *Wool Inquiry*. As the readers of this report will be principally those interested in wool-production, we may be permitted to condense some of the most important points presented in these answers.

As to the distinction between combing and clothing Australian wools, writes one of the respondents, Southey, Baline, & Co., "All

wools of Australian production can be used for clothing, but by no means all for combing. There are limits as regards length of staple, in the first place, and other requisites, such as soundness and elasticity, necessary for the latter purpose. It will be clear, therefore, that, within these conditions, no line of distinction can be drawn above or below which it can be said that this or that sample is a clothing-wool and a clothing-wool only, a combing-wool and a combing-wool only."

The committee, in their interrogatories, proposed for combing-wool the following points of excellence, or questions, which should distinguish a true combing-wool, viz., 1st, weight; 2d, color or lustre; 3d, length; 4th, freeness; 5th, fineness; 6th, elasticity; 7th, softness; 8th, soundness; 9th, evenness of fleece; and requested their respondents to divide a thousand points among them according to their respective values.

J. T. Simes & Co. reply: "Soundness is the first requisite in combing descriptions; next, length up to three and a half inches for fine Merino. This desideratum is a most essential one in combing descriptions. We should place the characteristics of a Merino combing-wool in the following order and value: Soundness, 300; length, 250; freeness, 175; weight, 100 (important to growers); evenness, 75; elasticity, 50; fineness, 50. Lustrous color is scarcely an element in Merino combing."

H. Schwartze: "Soundness and quality, not singly but combined, constitute the most valuable feature of a combing-, small growth and softness that of a clothing-wool."

Hazard & Caldicott give the following statement of the relative importance of qualities in combing-wools: Length, 170; density, 60; softness, 80; fineness, 50; elasticity, 90; evenness of fleece, 80; soundness, 170; weight, 150.

A similar question was proposed by the Agricultural Society in relation to the desirable qualities of clothing-wools.

To this Jacomb, Son, & Co. reply: "The chief requisites of a good clothing-wool are fineness, density, softness, and fitting qualifications."

H. Schwartze: "Small growth, softness, etc., combined, constitute the most valuable features of a clothing-wool."

J. T. Simes & Co.: "Clothing-wool may be estimated by the following points: Firmness, 300; softness, 200; density, 150; evenness, 100; elasticity, 100; weight, 100; soundness, 50."

Hazard & Caldicott give the following statement for clothing-wools: Length, 50; density, 140; softness, 80; elasticity, 170; evenness of fleece, 80; soundness, 80; condition, 140; weight, 150.

As to the question whether combing- or clothing-wools are likely

to be in most demand, the answers are substantially that the greater demand at present for combing-wools is due in some measure to the fashion for worsted coatings, but that no one can with certainty forecast the future. As to prices, it is said there is a difference of opinion, but the preponderance is that the best clothing-wools bring the highest prices, although they have less weight. As to shearing and shipping in grease, it is answered that this is almost wholly dependent upon local circumstances, such as the washing facilities at the station, though the washed condition is that most generally acceptable to various buyers and consumers. For uses in which color is an important quality, the unwashed wools stand at a disadvantage, as there is "a greater difficulty in procuring a bright color from wools which have been packed and shipped in the grease." The Bradford Chamber of Commerce decidedly recommends washing as "pecuniarily most advantageous to the grower."

As to cold- or hot-water-washing, the preponderance of opinion appears to be, that there is very little to choose between the two processes where both are efficiently and skillfully applied.

In reply to the question, What proportion of yolk should be retained in the wool? all agree that just sufficient yolk should be retained to give a "kindly handle" to the fleece, the amount being variously put at from 10 to 20 per cent. Webster, Dewall, & Co., say "the sheep should be allowed 48 hours minimum run between washing and shearing, but in cold weather more time might be required. No yolk should be retained, but it should be allowed to rise again after washing to the extent of 20 per cent. After washing, the fleece should be allowed to dry thoroughly on the sheep's back, and only sufficient yolk should be allowed to rise to give the wool a soft and silky feel. In fact, the aim under all circumstances, whatever process of washing may be adopted, ought to be to give this soft, silky handle. The slight quantity of yolk tends to preserve the wool, and cause it to retain its natural elasticity and strength."

In answer to the question as to sorting and skirting and packing, the respondents recommend that "fleeces should be carefully skirted and stripped of all locks, bellies, and stained, burry, or seedy pieces, great care being taken that shanks or kimpy hairs are not folded in the fleece. The pieces should include the pole-lock, belly-piece, skirting, and shank, and any portion towards the extremities which are either stained or badly infested with burr or seed, and by the removal of which the rest of the fleece will remain comparatively free from faults." In respect to the classing of wools, Mr. Schwartze says, "With very superior brands elaborate sorting is desirable. In

the case of medium and good wools, the separation into young wool, first and second combing, first and second clothing, cross-bred lambs, pieces, and locks is all that is required, while with superior and faulty wools plentiful skirting is sufficient."

This long abstract of the *Wool Inquiry* will be excused, as it serves to answer questions directly presented to the observer by the peculiarities of the Australian wool exhibits; while the whole review of the Australian wool industry anticipates many points which would arise in considering the Merino wool-culture of other countries.

It is a natural inquiry whether the Australian wools will continue to increase in the accelerating ratio which has been witnessed in recent years. In the last decade the increase in New South Wales has been threefold, the numbers of sheep in 1866 being 8,132,511, while the returns for the year 1875 reached nearly 25,000,000. The Commissioners of this colony declare in their *Official Catalogue* that if seasons continue propitious, and prices are maintained at anything like the present rates, the probability is very great that another ten years will see New South Wales doubling the number of her sheep, and able to exhibit a return of 40,000,000 or 50,000,000.

ARGENTINE REPUBLIC.

The country ranking second in importance in the supply of the wools of commerce is the Argentine Republic. The number of sheep, as stated by Dr. Oldendorff, the Chief Commissioner of this Republic at the Exhibition, from a numeration made by himself as Commissioner of her Agricultural Department, is 57,501,200, with an annual yield of 216,000,000 pounds of wool, all of which, as there are only one or two wool-manufacturers, may be said to be destined for export.

The details as to the numbers and distribution in the several provinces of this Republic, as furnished by Dr. Oldendorff, from the census of 1876, are as follows:

	Number.	Value.
Buenos Ayres	45,511,358	$72,818,172
Entre Rios	3,000,000	3,600,000
Santiago	1,200,000	960,000
Santa Fé	4,500,000	3,600,000
Corrientes	77,846*	878,000
Cordova	1,405,638	1,060,000
San Luis	113,815	170,000
Catamarca	114,420	145,000

* This probably should have been 770,846, as indicated by the value.

	Number.	Value.
La Rioja	53,932	$108,000
Tucuman	70,000	56,000
Mendoza	53,856	94,500
San Juan	120,200	285,000
Jujuy	514,621	331,473
Satta	64,930	46,000
	57,800,616	$84,152,145

The chief, though not to our own country the most important, portion of these exports consists of Merino wools. The exhibits of wools from the Argentine Republic, at the Exhibition, with the exception of that of Mr. Samuel B. Hale, scarcely did justice to the importance of this production. The most noticeable feature was the enormous size of some of the fleeces of Merino wool of the Rambouillet and Negretti stock,—one fleece, a pure-bred Negretti ram, grown in eleven months and eighteen days, weighed 31 pounds; other Rambouillet fleeces weighed 25 and 27 pounds. Two pelts were shown from sheep of the same race, one of which measured 5 feet 6 inches in length, and 4 feet in width at the hips, with a staple 9 inches in length. These fleeces, although they may exhibit the recent attempts for improvement, do not illustrate the general character of the Merino wool of this country. The general characteristic of these wools is lightness of fleece, the weight not usually much exceeding three pounds in the grease to the fleece. They are fine, soft, and short, and principally suited for the card, though generally wanting in strength and nerve. Their principal defect, however, is the clinging to the fleece of the *carratilla* or burr from the clover or white medoc on which these sheep feed, which seems to be inseparably connected with the productive lands and best pasturage. Notwithstanding these defects, which are obviated by burring machinery, and more recently by chemical processes applied either to the wool or to the cloth, these wools are in high esteem with the cloth-manufacturers, especially of Belgium and France.

The Argentine Republic vies with Australia in representing the results of the Merino wool-culture in the last century. The raising of fine sheep was not seriously commenced until 1826, when it began with the importation of good Merino animals, with German shepherds, under the direction of Messrs. Hannah & Sheridan, whose establishment still survives. When fairly commenced the production increased with an accelerating ratio. The exports rose from 944 bales in 1832, to 3577 in 1840, an increase of 280 per cent. in eight years. In 1850, it attained 17,069 bales, an increase in ten years of 380 per cent.

This Republic, with a climate where the cold of winter is so moderate as to exhibit no more severe effects than slight hoar-frosts which disappear with the morning's sun, with an extensive seaboard, an internal and arterial system of rivers counted among the finest in the world, and with a soil furnished by a rich and vast alluvial plain on a subsoil of silicious clay, would seem to have a capacity for an unlimited wool-production of Merino wool. It would be well if the same could be said of another branch of wool, the product of the same country,—that proceeding from the indigenous races, or rather the descendants of the coarse Spanish sheep introduced by the conquerors in the middle of the sixteenth century. These wools, proceeding from Churros sheep of Spain which have not been crossed with the Merinos, proceed from flocks found in the Sierra of Cordova, at an altitude of from three thousand to five thousand feet, also from other provinces of the Argentine Republic, as shown at the Exhibition, each known by the name of the province. The wool, long, though coarse, and produced in small fleeces, is in great demand in the United States for the manufacture of carpets. A plateau plain in the province of Cordova, of eight hundred superficial leagues in extent, at an elevation of above ten thousand feet, produces sheep of this race which bear much larger fleeces of long carpet-wools. Some of the pelts were shown at the Exhibition. The tendency is for these wools to constantly increase relatively in value, as they are grown only by the rudest people, who are rather diminishing than increasing in numbers. The question of the future supply of these wools is, therefore, one of serious consideration with carpet-manufacturers.

Three specimens of fleeces, styled "Lana de Lina," were also shown. These are the wools of the cross of the sheep and the goat. They resemble in appearance the wools of the sheep of the several provinces where they were grown, but are more wiry and slippery. Dr. Oldendorff, who is a man of thorough scientific and practical information upon all subjects connected with agriculture, and who has resided in Buenos Ayres for twenty years, being now the head of the agricultural department of the Argentine Republic, says that they are the offspring of the male goat and the ewe, never of the ram and the female goat, and are invariably sterile. The skins, dressed, are called *pellones*, and are used by the natives to cover their saddles. In traveling over the mountains, frequently eight or nine are put upon the saddle, on top of which the driver sits. They serve for his bed and covering as he bivouacs at night.

CAPE OF GOOD HOPE.

The third great source in the Southern Hemisphere of fine wools of commerce is the colony of the Cape of Good Hope. The statistics, as furnished by Mr. Coates, the Commissioner of the colony, are as follows:

Number of wooled sheep in 1875	10,064,289
Other sheep	944,050
Angora goats	972,733
Export of wool in 1874	43,000,000 pounds.

From H. Schwartze & Co.'s report, January 18, 1877, the following statistics in relation to the Cape of Good Hope are obtained:

Imports.	1876.	1875.	1876.	1875.
England	bales, 169,908	174,598	lbs., 42,054,712	44,170,950
Continent	1,033	997		
America	7,529	14,001		
Total	178,470	189,596		50,600,000

The imports into England are chiefly washed. They estimate the number of sheep at 16,000,000.

CHILI.

No facts as to the wool-production of Chili could be obtained at the Exhibition. Statistical reports give its exports of wool for 1872 as 5,773,821 pounds, for 1873 as 4,102,078 pounds, and estimate the whole clip of the country at 3,000,000 kil., or 6,600,000 pounds.

URAGUAY.

An official report of the exports of Montevideo (Uraguay) makes the whole

Exports of wool	51,953,854 lbs.
Imports from the Argentine Republic to be deducted	7,188,425
	44,768,829

Another statement gives the export as 57,042 bales; which, at 900 pounds per bale, the usual size for that country, would be equal to 51,637,800 pounds, from which are to be deducted 7,188,425 pounds imported from the Argentine Republic.

PERU AND BOLIVIA.

There are no sufficient data in relation to these countries. The best estimates give the amount of 6,000,000 pounds for both.

GERMANY AND AUSTRIA.

The exhibits of wool from Germany and Austria were limited to that variety of the Merino fleece commonly known as Silesian, but more properly called Electoral, from the Elector of Saxony, the country in which this wool was first produced. Some beautiful specimens of the Electoral fleeces were exhibited from Germany and Hungary, the latter grown by Hungarian nobles. They illustrated all the characteristic features of the "noble" wool, as it is sometimes called in Germany. The fibres of these wools, according to Mall, measure from 1.4 to 1.8 of a centime of a millimetre in diameter; a centime of a millimetre being equal to $\frac{1}{2540}$ of an inch. Nathusius-Königsborn, in *Das Woolhaar das Schaf*, makes the average measure of 10 hairs 1.79 centimes, 1418 to an inch. Among these hairs one hair measured 1 centime, equal to 2540 to an inch. According to the same author, 18 hairs of a very high-blood ewe average 1.53 centimes, or 1661 to an inch. The finest single hair measured 1.17 centimes, equal to 2164 to an inch. The finest Silesian ram averaged 1.54 centimes. Dr. George May, in *Das Schaf*, Breslau, 1868, in a table of measurements of 55 different kinds of wool, gives the finest, that of a Silesian super-elector, the very highest Electoral wool, as averaging 0.13 millimetres, equal to 1954 hairs to an inch. The length of these wools rarely surpasses 4 centimetres, and the weight of the average of many flocks' fleeces is scarcely over 1½ pounds. They are used at present only for the fabrication of the most precious of woolen goods, imitation Cashmere shawls, extra fine broadcloths, etc. The thick felts, now made in this country for the hammers on the keys of pianos, are made solely of this wool imported from Silesia. It is admitted that this branch of wool-production is everywhere diminishing. Saxony, the cradle of the race, has scarcely any of the Electoral sheep. Silesia still possesses a considerable number, while others are found in Moravia, Hungary, Prussia, and Poland, which produce all the superfine wools used in Europe. The whole production of the superfine wools of these countries in 1866 is stated by a competent authority as follows:

Hungary	560,000 kil.
Bohemia	110,000
Moravia	55,000
Silesia	85,000
Total	810,000

This small production is due to the small weight of the fleeces, the great care which the animals require, prices disproportionate to the

cost of production, and the loss of that distinction which formerly encouraged the growers of the noble wool. Mr. Bochner, of Austria, one of the Judges of this group, is authority for the statement that Count Hunyady, of Hungary, one of the exhibitors of the Electoral fleeces at the Exhibition, produces 12,000 pounds annually of these wools, which he sells at 90 cents, principally in France, for the manufacture of imitation Cashmere shawls; but at these prices there is no profit in the culture. The few growers of this wool in Hungary, who are generally noblemen, continue the production only from motives of pride. Most of the wealthy proprietors, who formerly made a specialty of the production, have abandoned it or allowed their flocks to run down.

In no portion of the world have so much science and intelligence been directed to the Merino sheep-husbandry as in the German states. Saxony was the first to acquire the Spanish Merinos in any considerable number, first receiving them in 1765. In 1774, the pure-blooded progeny of the Spanish importations amounted to 325 head. As the culture of this race extended, there grew with it a desire to increase the characteristic property of the fleeces or the fineness of the fibre. This passion, as it became, for the utmost possible fineness of fibre, irrespective of all other considerations, led insensibly to the methods of breeding which produced a race possessing this attribute in the highest degree, but with a corresponding delicacy of constitution and lightness of fleece. This race, known in this country as the Saxon and in Germany as the Electoral, or Escurial, both names being used indifferently, does not appear to have been the inheritance from any special Spanish Cabañas, but a production of art. The commercial demand produced by the reputation of their wools led the German growers to increase the size of their animals and fleeces. Another race was developed by the side of the one above described, the ideal of which was a robust body producing the largest possible quantity of wool of the utmost fineness consistent with the increased production. This race was called the Negretti, from Count Negretti, the proprietor of one of the most celebrated original Cabañas in Spain. It was also sometimes called the Infantado race, from the Duke of Infantado, another Spanish proprietor; both terms, as in the case of the term Electoral and Escurial, indicating the character of the race and not its special Spanish descent, as it is often erroneously held. The descriptive terms Negretti and Infantado were found at the Exhibition applied to wools of the same general character. While Silesia is still in possession of the largest number of the superfine Electoral sheep to be found in the whole world, Saxony, Pomerania, Mecklen-

burg, and Eastern and Western Prussia in time renounced the Electorals and replaced them by the Negrettis. Thirty or forty years ago Germany attained the utmost production that her land would permit. In 1850, according to personal statements made to the writer by Professor Grothe, the number of sheep in all the German states exceeded 50,000,000; at the present time they do not exceed 25,000,000. Mr. Dodge places the number at 29,000,000. It is said that she is even losing her magnificent Merino breeds; for not only the Electorals, but the Negrettis, are being replaced by the English long-wooled races. What effect this will have upon the once famous broadcloth-manufacture of Germany is an interesting subject of inquiry; while the question suggests itself, what relation this decline of the German fine-wool-industry has to the abolition of the former protective duties on imported wool.

The estimated product of wool in Austria, according to the returns made at the Exhibition, is about 30,000,000 kilogrammes of 66,150,000 pounds. The number of sheep is not given; but at three pounds of wool per head the number would be about 22,000,000. Mr. H. Schwartze and Mr. Dodge give, from returns in 1871, the number of sheep as,—

In Austria	5,026,398
Hungary	15,076,997
Total	20,103,395

The distribution of sheep in proportion to the area and population, in 1869, was as follows:

	Per square Kilometre-area.	Per 1000 Persons.
Dependencies represented in the Reichsrath	2476	367
Dependencies of the Hungarian Crown	1639	341
The Austrian Monarchy	2043	564

The largest flocks are found in Hungary. Beautiful superfine clothing-wool was exhibited by Count Alois Karolyr, from flocks bred at Stampfen. This flock numbers 80,000 head. The average length of staple of the fleece is about 1½ inch; the average weight of the shearings, the fleeces being warm- and soap-water-washed, is, winter lambs excepted, 2¾ pounds English. The whole clip, 145,000 to 156,000 pounds, is sold abroad, mostly to French manufacturers, for from 74 to 85 cents per pound.

RUSSIA.

The wools of Russia were well illustrated at the Exhibition by numerous fleeces and bales, and admirably arranged samples. The

most interesting were Electoral wools, comparing favorably with the Silesian and Hungarian specimens, samples of the Donskoi carpet-wools, and a series of beautiful samples from the estate of the Grand Duchess Katharine Michailoona, showing the extraordinary length of fibre obtained from sheep of the Rambouillet race. Sheep-husbandry constitutes one of the most important branches of rural economy in the Russian Empire. The full statistics obtained from the Russian Commissioner show that the total number of sheep in the Empire at the present time is 65,387,000,—Europe 49,493,000, Asia 15,894,000,—a number which gives a proportion of 81 sheep to each 100 inhabitants. The distribution of sheep according to the population in the great divisions of Russia is as follows:

The Provinces of Central Asia have	per 100 inhabitants	. .	565 sheep.
Caucasus	"	" . .	124 "
Siberia	"	" . .	90 "
Russia in Europe	"	" . .	70 "
Poland	"	" . .	65 "
Finland	"	" . .	49 "

Compared with the other great states of Europe, Russia occupies the fourth place.

Great Britain has	per 100 inhabitants	. . . . .	133 sheep.
France	" " "	. . . . .	97 "
Prussia	" " "	. . . . .	93 "
Russia	" " "	. . . . .	81 "
Austria	" " "	. . . . .	47 "
Italy	" " "	. . . . .	38 "

The total number is composed of 12,555,000 head of Merinos and 52,832,000 common sheep. The principal domain of the Merinos is comprised in the Government of New Russia, which forms the south-eastern portion of the Empire. The Governments of Caucasus, Siberia, and Central Asia have scarcely any, and Finland no Merinos; Georgia and Circassia possess mostly sheep of the ancient Colchian race. Generally considered, the fine-wooled sheep tend to decrease, as the increased price of wheat causes a large conversion of pastures into arable land. Both the Electoral and Negretti races are grown. The small product in wool of the former race, set down at two pounds for the ewe and three pounds for the wethers, has led to extensive crossing with the more vigorous race. The most successful crosses, and those now in most favor, are with Rambouillet rams. The reason given for this predilection is, that "this wool responds best to the exigencies of the present wool-production, since the clothing industry tends to decrease, while that of worsted tissues takes daily more development."

The culture of Merinos in the southern regions of the Empire is favored by the mildness of climate, the sheep requiring shelter and fodder only about six weeks. The greater part of the flocks is composed of a great number of head, single flocks reaching to fifty, seventy-five, a hundred, and even four hundred thousand head. Mr. Falz Feru, one of the exhibitors of excellent wool of the Government of Tanride, in the Crimea, has 230,000 sheep, all of Spanish blood, occupying 340,000 acres of land. These flocks consist of Negrettis, which appear to have attained in Russia an unusual hardiness, which favors their culture in immense flocks, requiring but little of that care so indispensable for the Electorals.

The great masses of the common sheep are found in the countries of Central Asia, in the Governments of the south coast of Russia in Europe, in the Caucasus, and in Siberia. They consist of four races, Tchoundki, or the fat-tailed sheep, belonging to the nomadic people, the Kalmucks and Kurds. The Valaque, or the Walladean or Zakel sheep, which also abound in Hungary and Moldavia, of a large size, with coarse, lustrous wool. They are found in the Caucasus, or region of the Don, and probably furnish the wool known as Donskoi. The Tsijai, commonly spelt Zijah, meaning Gipsey, or mongrel, with an exterior resembling Merinos, but with longer wool. The Russian race, of a small size with coarse wool, and a sub-race, Retchelof, found at the south of the Government of Poltava, which furnishes the black and white fleeces commonly called Astrakan.

The production of the Merino wool of Russia in the grease is estimated at 1,569,000 poods, equal to 56,484,000 pounds; of common wool at 9,245,000 poods, equal to 332,820,000 pounds, or $6\frac{3}{10}$ pounds to a sheep, the total having an estimated value of 46,357,000 roubles, or 32,449,000 dollars. The exports of wool are of a value of 13,999,534 roubles, supposed to be about 30,000,000 washed, equal to 50,000,000 pounds unwashed. There is a vast domestic consumption of common wools in the household for clothing, for carpets or mats, and for mattresses, while the sheepskins are largely used for clothing.

The enormous production of common wools, most of which, such as those from the broad-tailed and Valaque races, are admirably adapted for the carpet-manufacture, shows that this country will be one of the most important sources for the supply of the raw material for this industry.

FRANCE.

The wools of France had no representation at the Exhibition, except in fabrics and in the products of other countries which have been so largely influenced by an infusion of the blood of the French Merino.

This influence makes it necessary to dwell at some length upon the French wool-industry, since it is one of the lessons of the Exhibition.

The sheep-husbandry of France is unquestionably declining, at least in numbers. President Thiers said in 1870, "Our ovine population has gone down from 40,000,000 to 30,000,000." It is stated on the authority of the Inspector-General of Agriculture, that the number of sheep in France had been reduced from 30,386,000 in 1866, to 24,707,496 in 1876, a loss of 5,678,787 in six years. President Thiers attributes this decline to the absence of protective duties on wool, others to the abuse of an absurd law which allows the municipal councils to prescribe the number of head per *hectare* which each farmer is permitted to keep. The number of Merinos, or their grades producing fine wool, is estimated by M. Sanson at 9,000,000. The other flocks, consisting of indigenous sheep producing coarse wools, and some English mutton-sheep, have no special characteristics worthy of notice.

The wool-industry of France is remarkable for the influence it has had upon the combing-wool manufacture of the world, and consequently upon the sheep-husbandry of all the nations which supply it. Louis XVI. obtained from the King of Spain 200 rams and ewes of the pure race of Leon and Segovia, exactly a century ago, viz., 1776. In 1786 he obtained 367 more, which were the foundation of the famous Rambouillet flock. In 1799 France received, through the treaty of Basle, 5500 animals from the finest flocks of Castile. Sixty sheep-folds were established by Napoleon as accessories to that of Rambouillet, where proprietors could obtain the service of Merino rams free of charge. The directors of the national sheep-folds pursued in breeding precisely the opposite course to that adopted with the same original race in Saxony and with the *Tropeau de Naz* in France. They aimed to increase the size of the frame and the weight of the fleece. With this increased size and weight there was developed a corresponding length of fibre, and a Merino combing-wool was for the first time created. The French manufacturers were the first to avail themselves of this new property of wool which their own territory supplied. National pride stimulated them to create new fabrics from the new material supplied from domestic sources. They invented Mousselines de laine Merinos, cashmeres, *challis*, bareges, and more recently worsted coatings, in a word, all the woolen stuffs of the nineteenth century which distinguish themselves in their physiognomy from the tissues of the preceding centuries. The English and other manufacturing nations in due course followed the French example. Wool, instead of furnishing the ma-

terial for clothing for one sex, as formerly, supplied it for both. The Southern Hemisphere responded to this new and increased demand for Merino wool, and the fine sheep-husbandry of the world was modified to produce the combing-wools required for the new fabrics. To France must be accorded the honor of creating the most characteristic feature of the sheep-husbandry and wool-manufacture of the present century.

The scientific breeders of France, not contenting themselves with producing animals surpassing all others of their race in size and weight of fleece and length of staple, have more recently aimed to develop, together with the special qualities of the Merino fibre, the meat-producing qualities and precocity of development, which formerly were regarded as the exclusive aptitudes of the English races. They have succeeded in transforming the Merino into the most perfect mutton-sheep, having the same precocity and giving as much meat as the South Downs, reputed to be the best producers of flesh, while, at the same time, the total weight of the fleece is increased without augmenting the diameter of the fibre. In a word, the Merino, while becoming a mutton-sheep, preserves all its wool-bearing qualities. This method of development, requiring of course abundant food, should be suggestive to the occupants of the valuable lands in this country contiguous to city markets, where the merely pastoral sheep-husbandry has declined.

We must not pass by another product of French sheep-husbandry, perhaps the most instructive, in a scientific point of view, of any in the Exhibition, as illustrating the wonderful results which skillful breeding may accomplish by happily improving the accidents of nature. The product referred to is the famous Mauchamp wool, admirable specimens of which, both in staple and yarn, were exhibited by Mr. George W. Bond, who had personally visited the creator of this race in France, from whom he obtained his specimens. The characteristics of this wool are that to a fineness equal to that of Merino, and a length of staple which surpasses it, is added a lustre absolutely comparable to that of silk; a lustre so marked that, in a *challis* made with a silk warp and weft of Mauchamp wool, the stuff, which contained only one-eighth of silk and seven-eighths of wool, was as brilliant as if made entirely of silk.

The history of the creation of this race is so instructive that it may be briefly stated. In 1828 there was accidentally produced on the farm Mauchamp, in France, cultivated by M. Graux, a ram from a flock of Merinos, having a head of unusual size and a tail of great length, and also a wool remarkable for its softness, and, above all,

its lustre. M. Graux separated the animal from the flock and used it for reproduction, obtaining some animals similar to the sire and others to the dam. Taking afterwards the animals similar to the sire and crossing them among themselves or with the sire, which served for the type, he succeeded, little by little, in forming a small flock whose wool was perfectly silky. He afterwards succeeded in modifying the forms and the size of the animals, originally quite small, and attained a flock of six hundred head, all furnishing the silky wool. The flock was prosperous at the time of the breaking out of the Franco-Prussian war. Of its history since that period we have no knowledge.

ENGLAND.

The English wools were illustrated at the Exhibition by the beautiful collections of the wools of commerce of Messrs. Bowes, of Liverpool, and Bond, of Boston; and, at a later period, an admirable series of fleeces forwarded from Bradford, through the influence of one of our colleagues, Mr. Mitchell. The names and prices of these wools are given below:

Half-bred wether	15½ pence.	North Hampton hogget	16½ pence.
" hogget	16½ "	Kent wether	16½ "
Somerset wether	16½ "	Northumberland hogget	17½ "
Lincoln "	16 "	Gloucester hogget	16 "
North Hampton wether	15½ "	" wether	15 "
Yorkshire "	16½ "	Somerset "	16 "
Half-bred hogget	16½ "	Irish hogget	17½ "
South Down ewe	16 "	Devon (lustre) wether	17½ "
Leicester wether	16 "	Hereford "	16½ "
Shropshire hogget	16½ "	Yorkshire hogget	19 "
" "	18½ "	Lincoln "	18 "

The characteristics of the fibre of all the many English races were well displayed in these collections. It is necessary to say that England produces no Merino sheep, and that all are grown primarily for mutton, and secondarily for the wools, the latter being generally used for combing purposes, and entering into the manufacture of a large class of worsted goods. The wools of English races,—the Leicesters and Lincolns and Cotswolds,—for length, strength, and lustre, present the best type of combing-wool proper, or that used exclusively for combing-wool purposes. The lands being stocked with sheep to their utmost capacity, the numbers of sheep vary but little from year to year, so that returns of a few years back will pretty fairly represent the present production. The Government returns of 1868 show the whole number in England, Wales, Scotland,

and Ireland to be 34,532,000, which are classified by Mr. Graham as follows, according to the leading typical races:

Leicesters and their allies	12,933,000
Downs	6,130,000
Cheviots	4,368,000
Black-faced	5,101,000
Welsh	2,000,000
Irish	4,000,000
	34,532,000

The production of these races is thus estimated:

Leicesters,	12,933,000 fleeces	at 7 pounds	each	90,531,000
Downs,	6,130,000	" 4	"	24,520,000
Cheviots,	4,368,000	" 3	"	13,104,000
Black-faced,	5,100,000	" 2¾	"	14,027,750
Welsh and Irish,	6,000,000	" averaging 2 pounds		12,000,000
	34,532,000	Total number of lbs. washed		154,182,750

At an average price of 10 pence per pound, the value of the wool-product is £6,425,000. Taking the average age of these sheep at three years, about one-third, or 11,510,000, are killed for mutton annually; averaging the carcass at 65 pounds and the price per pound 8 pence, there are produced annually 748,150,000 pounds of mutton, realizing £25,000,000 per year. This, added to the annual value of wool, £6,425,000, makes the product of British sheep £31,425,000, or $159,125,000. To this is to be added the value of the manure, which can only be estimated by the fact that it is an indispensable necessity for British husbandry. This estimate is greatly increased when we add the value of wool from slaughtered sheep, say 36,000,000 pounds, and estimate the value of the wool at 15 pence instead of 10 pence, which is nearer the correct figure at the present time.

THE DOMINION OF CANADA.

The long wools of English blood exhibited by Canada attracted the high commendation of the Judges; an exhibit from Hamilton showing Leicester, Cotswold, and South Down wools, and that of crosses of Leicester and Merino, Leicester and South Down, Cotswold and Leicester, Lincoln and Cotswold, justified the popularity of these wools with the worsted-manufacturers of the United States. So prevalent is the culture of the long combing-wools in Canada, and so large their consumption in the United States, where they find their principal market, that the term Canada Wools is in general use to designate the wools of the English type.

We are indebted to the Minister of Agriculture of the Dominion of Canada for the latest official returns, made in 1871, which furnish the following statistics as to sheep and wool production:

Provinces.	Number of Sheep.	Pounds of Wool.
Ontario	1,514,914	6,411,305
Quebec	1,007,800	2,763,304
New Brunswick	234,418	796,168
Nova Scotia	398,377	1,132,703
	3,155,509	11,103,480

OTHER EUROPEAN COUNTRIES.

No exhibits of wool were made by Italy, which, according to Messrs. H. Schwartze & Co., has 6,977,104, and according to Mr. Dodge, 11,000,000 sheep. Portugal, which has about 3,000,000 sheep, made some excellent exhibits, and is declared by her Commissioners to be pursuing sheep-husbandry with a freshly-awakened zeal and energy. Spain, which has, according to both the authorities above mentioned, about 22,000,000 sheep, made a considerable number of exhibits of wool. But the observer could not fail to be struck with the fact that the Merino wools exhibited by the country which was the cradle of the Merino race, showed no evidence of their pristine excellence.

UNITED STATES.

It is a subject of great regret that the wools of the United States were so inadequately represented at the Exhibition. This was in some measure accounted for by the circumstance that the usual shearing had not taken place at the time when, by the rules of the Exhibition, the entry of exhibits was closed. At the request of the Judges of this group, an extension of time was granted to proposed exhibitors of wool, but with little effect. The few beautiful fleeces, especially from Ohio, but more than all the high character of American flannels, blankets, and fancy cassimeres, made exclusively of domestic wool, were sufficient to impress our foreign associates with the value of our wool-product.

The number of sheep in the United States is set down in the Census returns of 1870 at 28,777,951, and the quantity of wool produced at 100,102,387 pounds. It is believed that these returns are incomplete, as they only give an approximation of the number of sheep actually on farms at the dates of the returns, and were imperfect in respect to Texas and the Territories, while the amount of wool is also incomplete, as the returns of fleeces of sheep slaughtered in cities are not given.

The statistician of the Agricultural Department, Mr. Dodge, whom the writer has consulted, and who has made a special study of the subject, estimates the number of the sheep in the United States, in 1876, at not less than 36,000,000, producing, with the additional fleeces of those slaughtered within the past year, 155,000,000 pounds. The sheep of the United States consist, 1st, of what are called the native sheep, which are descendants of the unimproved coarse-wooled English sheep, first introduced. It is not known to what particular type of the English races they originally belonged, although it is known from tradition that certain of the common sheep were held in particular esteem for producing long worsted wools, which were hand-combed and spun in the families of New England for making yarns for worsted stockings. These sheep furnished the stock upon which the Merinos were engrafted. 2d. Descendants from the more recent English races, principally brought immediately from Canada. 3d. The Mexican sheep found in Texas, New Mexico, Colorado, and California, a coarse and sparsely-wooled sheep of Spanish descent, undoubtedly the race known as Charro. 4th. The Merino sheep and other grades. The latter constitute the principal and characteristic sheep of the United States. Six Merinos were introduced to the United States by different persons between 1793 and 1802. In the last-named year Mr. Livingston, the American Minister in France, sent home two pairs of Merinos obtained from the French Government flock. Later, in 1802, Colonel Humphreys, the American Minister in Spain, on his return from his embassy, shipped a flock to the United States, of which twenty-one rams and seventy ewes reached his farm in Connecticut. It is not known whether the Merinos imported prior to these left any descendants, although it is known that the Merinos proceeding from the import of Mr. Livingston sold for enormous prices. The next, and by far the most important acquisition, was secured in 1809–10, through the energy and fortunate position of Mr. William Jarvis, American Consul at Lisbon, in Portugal. In consequence of the invasion of Spain by the French, and the subsequent confiscation and sale by the Junta from celebrated flocks of Merino sheep, Mr. Jarvis was enabled to purchase a large number,—about 3500,—which he sent to this country and sold, except a few hundred, which he placed on his own farm in Wethersfield, Vermont, where they or their descendants have remained ever since. Four of these sheep were presented to Mr. Jefferson, at Monticello, who thus responded: "The four Merinos are now safe with me here, and good preparations are made for their increase the ensuing year. Pursuing the spirit of the liberal donor, I consider them deposited with me for

the general good; and divesting myself of all views of gain, I propose to devote them to the diffusion of the race throughout our State, as far as their increase will permit. I shall send a pair to every county of the State, in rotation, until the whole are possessed of them." In 1810 and 1811 there was an additional importation of about 2500 Merinos, all from the prime flocks of Spain, part of which went to New York and part to Boston. The Merinos arrived at a propitious time for their favorable reception. It was a period when our foreign trade was suspended by the embargo, and our people were driven to supply themselves with fabrics from their own resources. They hailed with eagerness the opportunity of supplying and improving the raw material for the wool-manufacture in which they had embarked. The Spanish races were eagerly sought to improve the common sheep, and flocks of full blood and grades were established in all parts of the country. Although the mania for Merino-growing, which rose so high during the war of 1812 that from 1000 to 1500 dollars was not unfrequently paid for Merino bucks, was checked by the peace of 1815, and the destruction of our wool-manufacture by the flood of importations, while many of the flocks were merged in the common coarse sheep of the country, others were kept pure and separate and the race was firmly established on our soil.

In 1824 a new impulse was given to our wool-manufacture through legislative influences. Factories on a large scale were established for making broadcloths. The fashion of the times required cloths of great firmness, such as were made in England and France from the wools of German Electoral sheep-husbandry, which was then at the height of its prosperity. The necessities of the broadcloth-manufacture required a finer wool than was supplied by Spanish Merinos, as they then were commonly called. Saxon, or Electoral Merinos, were imported in large numbers. The record is preserved of 2963 which were imported in four years. The first aim of the wool-growers thence for a period of fifteen years was to engraft upon their flocks the Saxon blood, though, fortunately, a few never entirely abandoned the old Merinos.

Through the effect of general causes, which insensibly led to the decline of superfine sheep-husbandry in all the Merino wool-producing countries of the world, there commenced in the United States about 1835 a reaction in favor of the neglected old-fashioned Merinos. Intelligent growers abandoned improvement through the Saxon stock, and sought for stock animals those of undoubted descent from the early Spanish importations. From this period the improvement of the American Merinos, as they began to be designated,

especially in weight of fleeces, was rapid. To give an illustration by no means exceptional, in 1835 the choicest flocks yielded 4½ pounds of wool per head. In 1844, flocks of the same proportion yielded 5 pounds 13 ounces of washed wool per head. In 1863, a flock of 157 two-year-old and yearling ewes yielded 7 pounds 2 ounces of fairly washed wool per head. In that year, at the International Exposition of Hamburg, the first prizes for the best heavy-wooled sheep—rams and ewes of 1761 competing animals—were awarded to Mr. Campbell, of Vermont, who exhibited American Merinos. In 1875, a flock of 33 ewes in Michigan produced 318 pounds of washed wool. At the American Wool-Growers' Association, in 1875, the premiums were awarded with the following report:

	Weight of Sheep.	Weight of Fleece.	Age of Fleece.
1st premium ram .	180½ lbs.	29 lbs.	11 mo. 21 days.
2d premium ram .	148 "	23 " 13 oz.	1 year 4 "
1st premium ewe .	108 "	17 " 3 "	11 mo. 22 "
Two-year-old ewe not entered for premium		22 " 8 "	1 year 5 "

Two races of our Merinos have acquired special celebrity: the Atwood family improved, descended from Colonel Humphreys' importation, and supposed, upon somewhat equivocal authority, to be of the ancient Spanish stock belonging to the Duke Supantado, and the Rich family, supposed to inherit Paular blood. All these alleged descents are believed to be equivocal and uncertain. The Wells and Dickinson, of Ohio, partially descended from Colonel Humphreys' sheep, samples of whose excellent wool were shown at the Exhibition, have had much influence upon the early flocks of the Western States. The most eminent improver of the American Merino was Mr. Edwin Hammond, of Vermont, who bred upon the Atwood stock. Of his work it is enough to say that he effected as marked improvement in the Merino as was made by Bakewell and Elman respectively upon the Leicesters and Downs of England.

We find, in this brief review, the names of Livingston, Humphreys, Jarvis, and Hammond, who are to be specially honored as founders of American sheep-husbandry. To these should be added that of Henry S. Randall, of Cortland Village, New York, recently deceased, at once a practical shepherd and a scholar. His example and his writings, which have contributed so much to elevate the pursuit of wool-growing in this country, are among the best fruits of American sheep-husbandry.

The special application of American wools will be considered under the head of fabrics. We will advert to one general attribute which is universally conceded to them, viz., their soundness and strength of

fibre. This, and perhaps the great development of fleece and weight, are to be attributed less to skill and the character of our soil and climate than to the prevailing system of keeping and the careful and thrifty habits of the people. The flocks, being generally small, are under the personal care of the proprietors. They are housed in winter and regularly and abundantly fed, and consequently produce a healthy and sound fibre. Thus our wools owe their best-distinguishing attribute indirectly to social or moral causes. It would be seen that our Merino wools, as a rule, belong to the class of intermediary wools produced in Europe by the Negretti race, now generally prevalent in most Merino wool-producing countries and increasing in others. Many of our manufacturers complain of the falling off of our fine wool production. The American wool-grower has seen little at the Exhibition to induce him to change his present system. He has found that the cloth-industry of the world is adapting itself to the intermediary wools such as he produces. Even fashion yields to economical necessities. The superfine wool-production is unnatural, artificial, and unprofitable. From the nature of things there can be no reasonable expectation of seeing it revived in this country. So small is the consumption of the superfine wools that what might be imported from abroad would hardly compete with American wools; and if it were possible to distinguish them so that there should be no possibility of fraud or evasion, they might without injury to the wool-grower be placed on the same scale of duties as carpet-wools, neither being advantageously produced here.

The reader would naturally look for particulars as to the distribution of sheep in the several States of our territory, with observations as to the characteristics of the wool in the different States as influenced by soil and climate. These particulars the writer hoped to supply, and with this view addressed letters of inquiry to each of the Commissioners from the wool-growing States. The information obtained was so meagre that he has been compelled to abandon his purpose. The wools of many of our States have characteristic qualities readily recognized by inspection or touch; but the most skilled expert would be unable to define, in language intelligible to the unskilled, differences which to him are perfectly palpable.

The deficiency as to the distribution of sheep in the several States, is approximately supplied by a statement which accompanied an admirable exhibit of samples of wools from most of the States and Territories of the Union, made by Messrs. Fiss, Banes, & Erben, of Philadelphia. This exhibit, made at the special request of the Superintendent of the Agricultural Department of the Exhibition, was

received too late to obtain the official award it deserved. The samples were well arranged and exceedingly instructive, especially as supplemented by the estimates of the number of sheep, which these gentlemen were so capable of giving with near approach to accuracy. This estimate is as follows:

	Number of Sheep.		Number of Sheep.
California	6,750,000	New York	1,936,500
Delaware	23,600	Ohio	4,546,600
Georgia	271,200	Oregon	710,500
Illinois	1,311,000	Pennsylvania	1,640,500
Indiana	1,250,000	Rhode Island	25,300
Iowa	1,663,900	Tennessee	341,700
Kansas	123,900	Texas	1,691,500
Kentucky	683,600	Vermont	490,500
Louisiana	68,800	Virginia	356,400
Maine	225,900	West Virginia	544,500
Maryland	141,200	Wisconsin	1,162,800
Massachusetts	76,300		
Michigan	3,450,600		Not given, Census of 1870
Missouri	1,284,200	Colorado	120,928
Nebraska	48,900	Utah	59,672
New Hampshire	242,200	Wyoming	6,409
New Jersey	125,800	Montana	2,024

The following States and Territories were not represented. We place against them the number of sheep in 1870, since which time some of them have immensely increased their flocks:

Connecticut	83,884	South Carolina	124,594
Minnesota	133,343	Washington Territory	44,063
New Mexico	619,438	Mississippi	232,732
North Carolina	463,435	Florida	26,599

There are some general considerations relating to American sheep-husbandry not yet referred to which should not be omitted. Sheep-husbandry in the older States is apparently declining, or is rather in that condition of suspense which precedes a transition to another form. In most of the New England States the number of sheep has greatly diminished, as in Connecticut, New Hampshire, Rhode Island, and Massachusetts. Vermont, however, still occupies an important position as a sheep-producing State, and in one respect is the first. The distinctive character of the sheep-husbandry of Vermont is the breeding of Merino sheep, and especially of rams, for exportation to other States and abroad. The influence of Jarvis and Hammond, and of the choice flocks of the purest Spanish races, introduced by the former, is felt throughout the State. The objection has been made to the Vermont Merinos that with the object of obtaining heavy fleeces there has been an undue development of yolk. The best breeders,

prominent among whom is Mr. George Campbell, of Westminster, are now working in a different direction. They are breeding so as to destroy the wrinkles formerly so popular as indicating a pure blood, but really useless, unsightly and inconvenient in shearing, to diminish the quantity of the yolk, and to make a hardy animal, fitted especially for regenerating the flocks kept in a state of exposure in Colorado and California. Vermont sheep at the Exhibition having attracted the favorable attention of the Commissioners from Australia, the wool-growers of the State subscribed for the purchase of a model ram and ewe, which they have courteously presented to the Agricultural Society of New South Wales.

The most remarkable event in the recent history of our wool-industry, is the rapid development of the pastoral sheep-husbandry in California and the trans-Missouri States. While in the oldest States wool-growing has been pursued with small flocks, as an adjunct to other husbandry, in these States it has been organized on a grand scale. It is conducted not by farmers, but by exclusive wool-growers, who are at the same time capitalists. There are single proprietors who have flocks exceeding a hundred thousand head in number. In 1868 the Pacific product was 15,000,000 pounds; in 1870, 23,000,000. In 1875 the product of California exceeded 50,000,000. The product for 1876 is stated as follows by E. Grisar & Co.:

Spring wool, 94,102 bales, weighing	28,230,000	pounds.
Spring wool shipped direct from the interior	1,834,919	"
Total spring production	30,064,919	"
Fall wool received, 73,952 bales, weighing	24,031,378	"
Fall wool shipped direct from the interior	204,073	"
Total fleece wool	54,300,370	"
Pulled wool shipped direct from San Francisco	2,250,000	"
Total wool production of California in 1876	56,550,370	"

The wool is rapidly improving and is in high demand. The great ranges of pasturage in the Pacific and trans-Missouri States, and the very little winter housing and feeding of forage required, give promise of a development of sheep-husbandry in those territories comparable to that of the Southern Hemisphere.

Conditions not less favorable, which are beginning to attract the attention of experienced wool-growers, exist in the vast area and favorable climate of Texas.

No reference has yet been made to a branch of our sheep-husbandry which promises to take the most prominent place in the older States, that of the long-wooled or mutton races, or their crosses with

Merinos. The culture of these sheep, which are of recent introduction, dating back hardly more than twenty years, has been largely influenced by the contiguity of Canada and the development of our worsted industry within the period mentioned. It has been peculiarly successful on the southern shores of Lake Erie, and in the States adjoining Canada. From returns furnished by the State Commissioners, it appears that of about 11,000 sheep in Wisconsin, about one-quarter are of the long-wooled races. Of 8,000,000 pounds produced in Michigan in 1875, about one-quarter is of the same race. In both States the culture of this wool is declared to be on the increase.

In Oregon, of 2,000,000 pounds produced in 1875, the quantity of long combing-wools was in the same proportion. The exhibits from this State show remarkable success in breeding, actually improving upon the English wools, while the climate shows peculiar adaptation to this product. Kentucky, favored by its blue-grass pastures, is also distinguished for the excellence and abundance of its long combing-wools. It has been proved by the best test, that of actual trial, contrary to the belief formerly prevailing, that our soil and climate are well adapted to these heavy sheep. The high prices of the wools, the increasing demand for good mutton, and the benefits to the soil, cannot fail to induce the farmers of the older sections of the country to follow the example of England. A new feature in our foreign commerce is the recent invention which permits the transportation to great distances of fresh meats, hung on shipboard in apartments suitably prepared, and the favor which American beef and mutton thus introduced have met in England presents unexpected inducements for mutton-growing in our Atlantic States.

Other English races not yet introduced, especially the Cheviot, should be tried. It is believed that this race is specially fitted for the high plateaus of North Carolina, where they would find a climate approximating that of their native locality. The mere acclimation and continuance of the English types is not sufficient. Attempts should be made to create new races of this class of sheep exactly adapted to our climate, manufactures, and conditions of agriculture. No wider field for zoötechnic achievements is offered than in this direction.

This sketch would be incomplete without some reference to the literature of American sheep-husbandry. The most eminent and influential worker upon this subject is Dr. Henry S. Randall, lately deceased, who by his writings and example has done more than any other to elevate what was once a neglected and accidental pursuit of the farmer to a cherished and dignified employment. His *Practical*

Shepherd has been pronounced the best book ever published on any branch of agriculture. Other eminent writers on this subject are Mr. George Geddes, whose contributions have appeared in the *New York Weekly Tribune;* Mr. A. M. Garland, of Illinois, the editor of the sheep department of the *Live Stock Journal*,—at present the fullest and most trustworthy source of information available to American wool-growers; and Messrs. Glenn & Co., of Pennsylvania, contributors to the *Practical Farmer*.

The Bulletin of the National Association of Wool Manufacturers, in six volumes, has notices of much of the foreign literature bearing upon the subject, with discussions of the economical questions connected with American wool-industry. It contains, besides, essays by Mr. George William Bond. Several of the most recent reports of State boards of agriculture contain essays of much value, particularly those of the States of Maine, Vermont, and Georgia. The reports of the National Department occupy the first position as sources of knowledge on the subject of sheep-husbandry.

RÉSUMÉ OF WOOL-PRODUCTION.

Messrs. Helmuth, Schwartze, & Co., of London, in their annual report dated January 18, 1877, say as follows:

"An attempt is made in the following to give a survey of the wool-trade in its largest proportions. Usually the view is confined to one market or to one country, or to colonial- or home-grown wools, as the case may be. Here, however, the circle is expanded to include all wools and all countries, as far as information reaches or even as data exist upon which reasonable guesses may be based. To arrive at such a view, the most obvious way would have been an inquiry into the total quantity of wool produced in the world. But, though we give an estimate of the number of sheep in existence, the figures are in several points too uncertain to allow of any conclusions being built upon them. It is nevertheless possible to obtain a view of the trade in its entirety in another way, viz., by ascertaining not the production of wool which takes place all over the globe, but the quantity worked up by the whole wool-industry, which, so far from being distributed over the whole earth, is in a developed form practically confined to Europe and North America. This has accordingly been done. Europe and North America are the manufacturers for the whole world; and, if the extent of their work can be gauged, an idea is really given of the entire trade. The subject resolves itself into an inquiry, first, of the home-production of these two continents, and

then of their imports, the two together giving the measure of the world. Expressed in millions of pounds' weight we find,—

	1875.	1876.
The home-production of Europe and North America .	830	798
The imports into North America	619	419
	1449	1217

1449 million pounds then represent the whole supply; and of this total about 57 per cent. were of European and North American home-growth, and about 43 per cent. imported. Apportioning this huge quantity, we find that no less than 351 million pounds, or very nearly a quarter of the whole, fall to the share of the British industry alone; the rest of Europe takes 844 million pounds, or 58 per cent.; North America, 254 million pounds, or 17½ per cent. In 1866, the total consumption of raw wool was 1217 million against 1449 million pounds in 1875, and the average annual increase was consequently about 2 per cent. Of this about 1 per cent. was directly owing to the increase of population, which in Europe and North America rose from 321 to 347 millions in the stated period, the remaining 1 per cent. being due to the employment of wool for new purposes, and to the spread of comfort and wealth generally. Calculated per head of population, the consumption of raw wool, in 1875, was $4\frac{18}{100}$ pounds, or, taking the wool in its cleaned state, $2\frac{35}{100}$ pounds.

"It need not be said that all these figures pretend to no accuracy, but are open to correction; all they lay claim to is this, that, wherever possible, they are based upon the latest authentic returns, and that where such basis was wanting, the estimates have been made with care and with a full consideration of all points involved."

ESTIMATE OF THE NUMBER OF SHEEP IN THE WORLD.

	Year of Return.	No. of Sheep.
United Kingdom	1876	32,252,579
Russia	1870	48,132,000
Sweden	1873	1,695,434
Norway	1865	1,705,394
Denmark	1871	1,842,481
Iceland	.....	800,000
Germany	1873	24,999,406
Austria	1871	20,103,395
Switzerland	1866	447,001
Holland	1873	901,515
Belgium	1866	586,097
France	1872	24,589,647
Italy	1874	6,977,104

	Year of Return.	No. of Sheep.
Spain	1865	22,054,967
Portugal	1870	2,706,777
Total Europe (excluding Turkey and Greece), about		190,000,000
Australasia	1875	62,000,000
Cape	Estimate	16,000,000
Mexico	"	16,000,000
River Plate	"	60,000,000
North America	"	50,000,000
Remainder of America	"	6,000,000
Total		384,000,000
Turkey, North Africa, Persia, etc., say		65,000,000
India and China, say		35,000,000
Grand Total		484,000,000

CONSUMPTION OF WOOL.

It will be observed that in the following tables the production and consumption of the United States are included in that of North America. In order to bring our own consumption into more distinct relief, the writer has requested Mr. George W. Bond to estimate the consumption of wool *per capita* in the United States, as compared with that of Great Britain, and has been favored with a reply. Deeming it unnecessary to confuse the reader with a statement of the complicated calculations by which Mr. Bond formed his estimate, we give simply the results. Of domestic wool and that imported, either in the form of wool or fabrics, the average consumption of the people of Great Britain is set down at three and two-thirds pounds of clean wool per person. The consumption of clean wool in the United States is set down at four and a third pounds per head. Although the tables which follow may surprise enthusiasts, by showing how gradually the consumption of the raw material of the wool-manufacture of the civilized nations increases, it being at the rate of but about 2 per cent. for each year of this last decade, they show progress and stability of progress. They show that wool is holding, and likely to hold, its place among the few great national staples which make up the bulk of commercial commodities; and that a great step towards commercial and industrial independence is made by the nation which has planted a prosperous sheep-husbandry upon her soil.

CONSUMPTION OF RAW WOOL IN EUROPE AND NORTH AMERICA.

In Millions of Pounds Weight (*thus* 247.7 = 247,700,000 *lbs.*).

Production of Europe and North America.	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866
	Million Pounds.	Million Pounds.	Million Pounds.	Million Pounds.	Million Pounds.	Million Pounds.	Million Pounds.	Million Pounds.	Million Pounds.	Million Pounds.
United Kingdom	162	167	165	156	152	158	165	172	163	145
Continent	462	464	473	475	480	485	490	495	501	504
British North America	13	13	13	13	13	13	12	12	12	12
United States	193	178	175	160	146	163	162	177	160	137
Total Product	830	822	826	804	791	819	829	856	836	798
Imports into Europe and North America.										
From Australasia	247.7	229	192.6	185.2	183.1	175.1	158.6	155.7	133.5	114.6
" Cape of Good Hope	50.6	48.7	48.6	58.1	52	42.8	41.8	39.3	38.6	38
" River Plate	207.9	208.5	230.7	212	198.7	185.2	205.6	198.8	171.8	157.2
" West Coast of South America	7.7	7.5	7.6	10.4	8.1	7	8	9	11.6	8.6
" Turkey and North Africa	66.6	60.6	70.4	86.4	70.1	38.2	44	52.1	51.5	62.4
" East India	22.8	19.2	19.3	18.9	19.7	11.3	18.8	17.6	15.3	26.3
" other Countries	4.8	5.3	4.3	5.7	5.7	5.8	5.3	5	4.1	3.9
Imports of Alpaca	4.2	4.2	4.4	3.8	3.6	3.9	3.3	1.8	3.5	3.6
" " Mohair	6.8	8	6.3	6.5	8.7	3.1	4.5	7	2.7	4.4
Total Imports	619.1	591	584.7	587	549.7	472.4	489.9	486.3	432.6	419
Production of Europe and North America	830	822	826	804	791	819	829	856	836	798
Imports " " "	619.1	591	584.7	587	549.7	472.4	489.9	486.3	432.6	419
Grand Total	1449.1	1413	1410.7	1391	1340.7	1291.4	1318.9	1342.3	1268.6	1217
Consumption of United Kingdom	351.3	363.6	358.5	324.1	336.7	322.7	299	317.2	299.6	312.5
" " Continent	843.7	812.3	816.7	793.9	763	762.2	801.2	811.1	763.7	696.5
" " North America	254.1	237.1	235.5	273	241	206.5	218.7	214	205.3	208
Total Consumption of Raw Wool	1449.1	1413	1410.7	1391	1340.7	1291.4	1318.9	1342.3	1268.6	1217
Estimated yield of Clean Wool after Washing	816.2	799.3	794.3	784.2	761.1	733.8	746.4	761.3	724.4	699.2

CONSUMPTION OF RAW WOOL IN EUROPE AND NORTH AMERICA.—*Continued.*

	Percentage of Total Consumption.	Percentage of Total Consumption.	Percentage of Total Consumption.	Percentage of Total Consumption.	Percentage of Total Consumption.	Percentage of Total Consumption.	Percentage of Total Consumption.	Percentage of Total Consumption.	Percentage of Total Consumption.	Percentage of Total Consumption.
Production of Europe and North America	57.3	58.2	58.6	57.8	59	63.4	62.8	63.8	65.9	65.5
Imports into " " " "	42.7	41.8	41.4	42.2	41	36.6	37.2	36.2	34.1	34.5
	100	100	100	100	100	100	100	100	100	100
Consumption of United Kingdom	24.2	25.7	25.4	23.3	25.1	25	22.7	23.6	23.6	25 7
" " Continent	58.2	57.5	57.9	57.1	56.9	59	60.7	60.5	60.2	57.2
" " North America	17.6	16.8	16.7	19.6	18	16	16.6	15.9	16.2	17.1
	100	100	100	100	100	100	100	100	100	100
	Millions of People.	Millions of People.	Millions of People.	Millions of People.	Millions of People.	Millions of People.	Millions of People.	Millions of People.	Millions of People.	Millions of People.
Estimated Population of Europe and North America	347	344	341	338	335	333	330	327	324	321
	Pounds of Wool.	Pounds of Wool.	Pounds of Wool.	Pounds of Wool.	Pounds of Wool.	Pounds of Wool.	Pounds of Wool.	Pounds of Wool.	Pounds of Wool.	Pounds of Wool.
Consumption of Raw Wool per head of Population	4.18	4.11	4.14	4.11	4	3.88	4	4.10	3.91	3.89
" " Clean Wool per head of Population	2.35	2.32	2.33	2.32	2.27	2.20	2.26	2.33	2.23	2.18

NOTE.—All figures relating to Europe in these tables exclude Turkey and Greece.

WOOL FABRICS.

CLASS 235.—Card-Wool Fabrics,—Yarns, Broadcloth, Doeskins, Fancy Cassimeres, Felted Goods, Hat Bodies.

In considering the different classes of the manufactured products of wool at the Exhibition, it would be inconvenient, if not impracticable, to observe the geographical arrangement pursued in discussing the raw material. The peculiar national distinctions are less marked than in the raw material, and the products of some countries exhibit nothing calling for particular remark. It would be interesting to give the statistics of production of the different countries exhibiting, but these were not obtainable from any sources at our command.

The fabrics of the class now under consideration, with the exception of yarns and hat bodies, may be properly designated as "cloths." The most marked impression made by an examination in detail of the cloths of different countries was the cosmopolitan character of the cloths of all manufacturing nations. Although there are marked distinctions in the kinds of cloths, these seem to bear the impress of the time, or the fashion of the time, rather than of the country of fabrication.

This is especially true of the great mass of cloths for general consumption, which can scarcely be distinguished except by the degrees of perfection in their fabrication. It has been remarked that woolen cloths, by their universal use, have tended to obliterate the outward social distinctions of classes. It was observable at the Exhibition that they served to obscure the distinction of nationalities. This uniformity may be partially due to the supremacy of fashion, made more universal by modern facilities of communication, but equally to the identity of modern machinery, and the influence of the raw material upon manufactures.

In the last and in the early part of the present century, scarcely any fabrics were known under the designation of "cloths," except broadcloths, and twilled fabrics similar in face to broadcloths, called "cassimeres." Each piece was uniform in color. Variety of color and shade was the only element which the manufacturers had at command to satisfy the taste for change or the caprice of fashion. The principal distinctions were in the fineness and perfection of finish.

From the descriptions which remain of the methods of weaving broadcloths in the French convents during the fourteenth century, this fabric would appear to be now substantially the same made four

centuries ago. The only change is in the fineness of the wools used, and the perfection of the face of the goods, due to better processes of shearing and pressing. This fabric will doubtless always occupy the first rank among woolen tissues. In this typical product of the woolen manufacture, the broadcloths from the West of England still occupy the eminent position accorded to them in all other International Exhibitions. The thickness and solidity of these cloths were not less conspicuous than their fineness and beautiful face. This was especially noticeable in the scarlet military cloths. All these cloths bear the designation of *Electoral*, signifying the kind of wool of which they are made; and, in fact, they are made of the highest-priced Silesian wool. The prices at which they were marked corresponded with their quality. The contrast of these goods with certain others made in England for export was remarkable. These fabrics are made chiefly for home consumption by the wealthy classes. For the class of consumers who use these goods, the competition among the manufacturers is in excellence rather than in cheapness. But the Judges had the proof within their own group that the skill required to produce these fine cloths is not an exclusive monopoly. One of our colleagues, Mr. Lang, who commenced the manufacture of broadcloths in 1814, exhibited, though not for competition, samples of blue and black broadcloths, made in 1853, at Vassalboro', Maine. The wool was selected Silesian, costing, with duties and charges, about three dollars per pound. The cloth had one hundred and twenty picks to the inch. The cloth, in fineness and perfection of finish, was admitted to surpass even the West of England broadcloths.

The comparatively low position of the United States in the manufacture of *fine* broadcloths cannot be denied. It was manifested by the absence of any notable exhibits, except by a single establishment, the Burlington Mills, of Vermont. Their exhibits showed that our apparent inferiority in this manufacture was not due to any want of skill or capacity, but to other causes. This mill produces annually some $300,000 in value of broadcloth, and it is known that another mill in Massachusetts, which did not exhibit, has shown equal proofs of its skill in this manufacture. The products of the mill first referred to would undoubtedly suffer in comparison with the West of England standards, for the goods, beautiful in face and fineness, were lacking in weight. But they were intentionally made to conform to the prevailing fashion of the higher standard of the German light weight goods, with which they bore a favorable comparison. It would be erroneous to make the position of the broadcloth industry a reproach against the American woolen manufacturer.

The same apparent decline, though perhaps not in the same degree, is witnessed in most other manufacturing nations. Superfine broadcloths are now used only by a limited class, and by that class rarely, except for dress coats, which last for years. The coats are made by fashionable tailors, who, as a rule, prefer foreign cloths. As the fine cloths are principally used by the easy classes, the duties upon the fine foreign cloths are no impediment to their consumption, while the specific or weight duty is less onerous upon them than upon common cloths.

The capacity to manufacture the finest broadcloths in this country was proved, many years ago, by the celebrated Middlesex Mills of Lowell, Massachusetts,—in age, influence, and continuity of excellence standing at the very front of our cloth-mills. In ceasing to give prominence to the fine broadcloth manufacture, it has manifested no failure in skill, but simply an adaptation to the wants of the times.

The diminution in the American manufacture of fine broadcloths has been attributed to the effect of the tariff of 1846. It has also been materially influenced by the constantly diminishing domestic supply of superfine wools, the Saxon wool-culture, as we have seen, having nearly ceased; for it is well established that an abundant domestic supply of raw material is one of the most potent of the influences which give a special character to the manufactures of a country. But the principal cause of the decline referred to is the popular demand for other fabrics, hereafter more fully referred to. In a word, our manufacturers have ceased, as a rule, to make fine broadcloths, because they find ample and more profitable employment for their looms in the production of the lower cloths which enter into general consumption. It has been observed that a similar decline, or more strictly speaking, diminution, of the fine-cloth manufacture is observed in other countries. Although a few excellent broadcloths and satins, or doeskins of remarkable beauty, were exhibited by Belgium and Germany, the Judges of large experience in dealing with woolen fabrics failed to find, in the exhibits of Belgium and especially of Germany, that competition for excellence in the production of superfine cloths which they had been led to expect from the former reputation of Belgian and German manufacturers. In the production of plain-faced goods of a lower grade, adapted for special uses,—such as blue and gray uniforms for soldiers, police officers, newsboys, and watchmen,—there were evidences of much progress, both in fabrication and cheapness, on the part of American manufacturers. Our regular soldiers, wearing American fabrics, are declared by our army authorities to be better clothed than any in the world. The beauty

of the uniforms of our volunteer troops, many thousands of whom were in procession on the Centennial Fourth of July, was specially noted by the foreign Judges. The production of blue police cloths has become an extensive branch of our manufacture, and the cloths are marked for their cheapness, durability of dye, and solidity of fabric.

The period of 1836 was an epoch in the cloth industry of the world and of the century. It was the commencement of the change which has produced a character of the cloth fabrics, for general consumption throughout the world, which was one of the most conspicuous features of the Exhibition.

In 1834, M. Bonjean, a prominent wool-manufacturer in Sedan, France, and an *élève* of the Polytechnic School, conceived the idea of modifying the plain cloths hitherto universally made, by uniting upon the same stuff different tints or patterns of tissue. This he was able to effect by the Jacquard loom. It was evident that the variety of stuffs which could be thus made was as unlimited as fancy. Hence he styled his woolens fancy cassimeres. These cloths, put on the market, and displayed at public exhibitions, instantly struck the popular taste, and were imitated, at first in France, and then in all other manufacturing nations. Their introduction into this country is an illustration of the benefits flowing from National Exhibitions. In 1840 an American gentleman, arriving directly from Paris, visited Mr. Samuel Lawrence, then agent of the Middlesex Mills at Lowell, Massachusetts. In the words of Mr. Lawrence, "He had an overcoat woven in diamond figures, of great beauty; said he saw it at an Exhibition, at Paris; Bonjean & Son, of Sedan, were the manufacturers. He gave me a small bit from the inside of the collar." With this bit as an example of what was to be done, Mr. Lawrence applied to Mr. George Crompton to adapt machinery for this tissue, already devised in cotton fabrics; and the result was the invention of the Crompton loom, upon which fancy cassimeres have since been woven, not only in this country, but in Sweden, Germany, Austria, and Belgium. From this statement, it would seem that fancy cassimeres were first made in this country at Lowell. But it should be observed that the honor of the first introduction is also claimed by the New England Mills of Rockville, Connecticut. The new cloths were adapted to the natural change which had begun to take place in the culture of wools. They required soundness, length, and strength, rather than the softness and fineness which had been the essential qualities of clothing-wools. The more abundant supply of the intermediary wools has continued to favor the production of the fancy woven

cloths; and from their great predominance at the Exhibition, and in the business suits commonly worn, it would seem that they comprise from three-quarters to nine-tenths of all the cloths made at the present day.

In the class of fancy woven cloths,—including not only fancy cassimeres, but clothes for overcoatings and worsted coatings,—the manufacturers of Elbeuf and Sedan sustained at the Exhibition their long-established reputation for novelty of design and perfection of fabrication; and Belgium was not far behind. The fine and thin cassimeres of Belgium, called "Batistes," made for consumption in tropical countries in the place of cotton and linen fabrics, were conspicuous for their beauty. Among the British exhibits,—besides some fancy cloths exhibited by West of England manufacturers, woven by a novel process analogous to knitting,—certain solid and substantial fancy cloths, made in Ireland, of Cheviot wool, with double and twisted yarns, received special commendation, and are worthy of imitation here.

The writer may be permitted to speak of the admiration and surprise expressed by the foreign Judges of this group, at the first inspection of the American fancy cassimeres. The goods of our exhibitors, it may be remarked, were arranged with good taste, in costly but not obtrusive cases, which served to enhance their favorable impression. The Swedish Judge, Mr. Carl Arnberg, a practical wool-manufacturer of large observation, will pardon the repetition of his precise language addressed to the writer: "You know that the best fancy cassimeres in the world have been made at Sedan and Elbeuf in France. If these goods were placed by the side of the Elbeuf cassimeres, you could not tell one from the other, and the goods could not be bought at Elbeuf for the prices marked here." It was conceded by all the Judges that our fancy cassimeres, in material, fabrication, and design, had attained the highest standard of this fabric. No single mill or State could claim the palm; for the honors were divided between a mill in Utica, New York, one in Pittsfield, Massachusetts, and three mills in Rockville, Connecticut, while other mills so nearly approached them as to make their special mention almost invidious. This favorable impression of our foreign associates was confirmed by visits which they made to some of the mills which had exhibited. They shared the opinion expressed to the writer by Professor Grothe, of Germany, author of the most complete modern treatise on the card-wool manufacture, that the American mills which he had just visited were in possession of the best and most recent processes, improvements, and machines known in Europe, and were admirable in their

administration. It is due to our wool-growers to say that the cloths so highly commended were made generally of American wool, Australian wool being used in some cases, not from preference, but to eke out the short supply of the domestic stock.

It is proper in this connection to depart from the strict arrangement of the classification to consider a class of fabrics which, though made of combed wool, are really cloths, and are directly allied with the card-wool fabrics just reviewed. The Exhibition showed that the most formidable rivals of the fancy cassimeres are the fabrics known as worsted coatings. Being woven in the fancy loom, either Jacquard or Crompton, and made for the same purposes and by the same manufacturers as the cassimeres, they differ from them only in the respect that the cassimeres are made of carded and the worsted cloth of combed wool. This fabric, created in France, in the introduction of its fabrication to this country affords another illustration of the benefit of International Exhibitions. Mr. E. R. Mudge, of Boston, being Commissioner of the United States at the Exposition of Paris of 1867, was impressed with this fabric then exhibited, and then much worn both in London and Paris, as a novelty. Seeing that it was made of combed Merino wool, he directed inquiries to ascertain if suitable wools for this fabric could be abundantly furnished by American fleeces. Satisfying himself affirmatively upon this point, he imported and introduced the requisite machinery for combing and spinning the wools at the Washington Mills, in Lawrence, Massachusetts, of which he is a leading director. This establishment succeeded so well in the fabrication of these stuffs, and they proved so popular when thrown upon the market, that the introducer soon found a host of rivals and imitators. A new industry at once sprung up,—that of combing and spinning the wools into worsted yarns, for supplying the many fancy cassimere-mills which desired to weave these fabrics. One of the most conspicuous displays at the Exhibition was that of the United Spinners' Association of Philadelphia, comprising eight distinct establishments, all exclusively devoted to making Merino combing-wool worsteds for worsted coatings and for suspenders and india-rubber goods, and producing an annual product of $1,500,000. The perfection of the yarns was fully recognized by the experts in the group of Judges. They were made almost exclusively of American Merino wool, which the exhibitors declared to have proved preferable for their purpose to even the best Australian wools, being "kinder, more elastic, and stronger." Here was a new industry founded scarcely six years ago, and a palpable demonstration of new and unsuspected qualities of excellence in American wools,—a de-

monstration most gratifying to those who, twelve years ago, had pointed out these qualities to incredulous manufacturers.

The American worsted coatings were extensively exhibited. The excellence attained in so short a period was a matter of surprise. While the fine diagonals of Sedan were not equaled, the American exhibit, as a whole, compared favorably with those from abroad. In the fabrics for overcoatings, Moscows, Kerseys, Castor beavers, and Elysians, there was the same general resemblance in the stuffs from different countries, already spoken of as forming one of the characteristic features of the woolen manufacture of the present day. All the kinds made abroad, with the exception of special novelties,—like the beautiful *peau d'ours*, a species of Moscow coating made at Dussen, in Germany, and the delicately soft Montagnac overcoatings of Sedan,—are made in this country; and our fabrics did not suffer by comparison.

The value of a manufacture is shown less in costly fabrics than in the common cloths combining utility and cheapness. Commendation was given to a mill established as an accessory to the largest iron-making establishment in Pennsylvania, in which the women and children of the operatives obtained employment, and which furnished cloths, marked for their soundness and cheapness, for the workmen. Many of the combinations of wool with cotton or union cloths were noticeable for cheapness and utility, such as the Kentucky jeans with cotton warps and wool filling, in much esteem for cheapness and wearing qualities in the agricultural districts in the Southern and Western States. The repellents, or water-proof cloths, show another union fabric.

FELTED GOODS.

The exhibits of felted goods, quite numerous and varied from the United States, were few and barely incidental from foreign nations; and those which were seen were Oriental in their origin or affinities. They were incidentally seen in the national fez of Turkey, so enduring in fabric and pleasing as well as enduring in its madder-red color; in *fils* of exquisite softness to the touch, made of camel's hair, forming the ground for costly Turkish embroidery (a material deserving more extensive use for this purpose); and the thick Russian felts made up into boots and gaiters,—the only foot-covering, according to Mr. Bielsky, the Commissioner for Russia, capable of resisting the cold of a Siberian winter. These articles also deserve imitation. It is believed that felted cloth was the most natural and the first stuff employed by man. We cannot reflect without pride that the first invention of primitive man in the textile arts, originating in Asia, the

cradle of the race, and still in use among the ruder tribes of the East, remained without progress for centuries, until revised, amplified, and made tributary to domestic comfort and the arts in all civilized communities, by our own countrymen and in our own times. M. Kœppelin, a French expert, speaks thus, in the *Annales du Genie Civil* of 1869, of this fabric: "In spite of the simplicity of its fabrication, and in spite of the antiquity of its origin, felting was for a long time abandoned to the lesser industries. It is only within thirty years that the mechanical fabrication of felted cloths has been essayed. Many fruitless attempts in this direction were made in France and other countries; and it is only to the spirit of invention of two Americans, Wells and Williams, that we owe the processes now in use, and which have not been materially modified since the epoch of their discovery." Their processes, he says, were applied in France and England, and are used in the latter country for making printed felt carpets, exported in vast quantities all parts of the world, and popular from their great cheapness.

No other published notice of this interesting invention has come within the notice of the writer. He has fortunately come into possession of other facts in relation to the introduction of this important fabric, creditable alike to American ingenuity and British enterprise, which seem worthy of a detailed notice, because not hitherto known to the public. The facts are derived from a personal communication by a gentleman hereafter mentioned.

Thomas Robinson Williams, of Newport, Rhode Island, connected with the Hazard family of that State, so well known as wool-manufacturers, invented the process of making felt cloth of commercial length, at Rhode Island, about 1820. About 1824, he went to England, for the purpose of introducing this invention, and also one for making hat bodies, in which he was associated with a Mr. Wells. He took out a patent in England in 1830. He succeeded in enlisting the co-operation of capitalists, who, about 1838, erected a factory in Leeds, with a capital and plant of £250,000, the designation of the proprietors being the Victoria Cloth Company. Meeting with immediate success in the fabrication, the enterprise created a great excitement in manufacturing circles, as it threatened to revolutionize the whole system of cloth-making. The principal editors of the London papers visited the establishment, and vied with each other in descriptions of the new art. The Queen gave extensive orders for the stuffs, and the Mistress of the Robes—the Duchess of Sutherland—furnished the grand staircase and vestibule of her London residence with a crimson carpet of the Williams felting, draping the windows

of the hall with a thinner fabric of the same make. In the full tide of its success, the vast establishment was destroyed by an incendiary fire. It was uninsured; and Williams, whose whole property was in it, died from grief and disappointment. In the mean time, a patent for making felt cloths of a commercial length, by an entirely dissimilar process, had been taken out by Joseph Waite, of Leeds, the use of which in England was enjoined by the courts, as conflicting with Williams's patent. Mr. J. Burrows Hyde, of New York, our informant as to these facts, a gentleman of science and enterprise, bought both the Waite patent and the Williams patent in this country, and sold the rights to the Bay State (now Washington) Mills, at Lawrence, Massachusetts, about 1853. For many years this mill enjoyed nearly the complete monopoly of this fabrication in this country, to its great profit. The exceptions to this monopoly were a fabrication of felt cloths, not of commercial lengths, conducted in Norwalk, Connecticut, under the Bishop patent, and the manufacture of hat bodies, conducted under the Wells patents. The Williams and Waite patents having expired in Europe and this country, the manufacture has attained the wide and vast extension of the present day.

While few foreign exhibits of this fabric were noted, the American felts appeared in innumerable forms. They appeared as printed and embossed piano-cloths and as ladies' skirts; as floor-cloths printed by a Philadelphia establishment, with highly artistic designs; as a material for sheathing roofs, vessels, and iron buildings; combined with asbestos, as non-conducting envelopes for steam-boilers and hot-air pipes; for lining rubber fabrics (being the only material which stretches equally in all directions); in soles for shoes and in gun-wads, in masses of several inches in thickness, for polishing wheels and buffers for jewelers; in other forms, for polishing cabinet-work and marble; and, in a high-cost material, for hammers of piano-keys. Conspicuous among these exhibits were the felts for polishing, made by Charles N. Bacon, of Winchester, Massachusetts, which possessed a thickness, compactness, and adaptation to special purposes which has never been surpassed. In the common felts the raw material is hair, or the cheapest Mexican wool, and in the others, as before said, the finest wool from Silesia. These were interesting illustrations of the almost infinite uses which may be derived from a single attribute of a fibre, all resulting from the serratures in the filament of wool and hair, which give them their felting power.

Allied to these goods, though not strictly felts, are the feltings used in paper-making, which are woven fabrics highly felted. The enor-

mous extension of our paper-manufacture has of late years stimulated a supply from domestic sources of this indispensable material for paper-making, not long since obtained from abroad. Exhibits of paper felts were made by several mills. A letter from Messrs. Rice, Kendall, & Co., paper-manufacturers and dealers in paper-makers' supplies,—the head of the firm being the present Governor of Massachusetts,—expresses the general character of the American felts, although having in view the product of a special mill. "We have introduced them," they say, "into paper-mills making all the finer qualities of bond- or writing-paper; also best and ordinary book-, news-, Manila-, tissue-, straw-, and sheathing-paper; also printers' and woolen manufacturers' press-boards, leathers, and binders' boards, and wood-pulp; and have had many high recommendations from the manufacturers regarding their wear and suitable quality. . . . We feel confident that they (the American felt-makers named) are able to manufacture anything in the line of feltings used by the various manufacturers of paper; and, judging from our former experience as importers of felts, they have made many improvements in them." It is curious that the art of joining the two extremities to make an endless felt is kept a secret by the fortunate possessors, for the use of which manufacturers pay a royalty.

Although no hat bodies—another form of felted goods—were exhibited, several special machines for forming hat bodies were shown, illustrating how completely the handicraft had been substituted by machinery. There is hardly a process in the manufacture which is not now done automatically, a single establishment turning off eight hundred dozen of hats daily. The hatter, as a separate artisan, has disappeared. Fifty years ago there was one in every village. A hatter's bow having been recently required in a patent trial, a diligent search could not find one in the country.

CLASS 236.—Plain Flannels, Dometts, Opera and Fancy.

The flannel-manufacture, almost exclusively represented at the Exhibition by American exhibits, has attained an enormous development in the United States, as illustrated by the fact that an auction sale, in July last, by a single house representing 157 sets in different mills, netted $2,500,000. Flannel being the first stage in the manufacture of plain cloth, it constitutes one of the principal products of the smaller mills in the new States; while, in the older manufacturing States, mills employing from ten to fifty sets are exclusively engaged in its manufacture. The great domestic demand for these goods may be attributed to the rigor of our climate, or to the fact

that the masses of our population are liberal in providing themselves with the fabric so essential for personal comfort. Flannels find their consumption not only in men's garments,—for which purpose their use has vastly increased through better hygienic knowledge,—but in garments for children, linings for overcoats, blouses for workmen, fatigue uniforms for soldiers and police officers, and coats for summer wear.

It is some twenty or thirty years since the American fabric excluded foreign flannels from our market, with the single exception of opera flannels, which no longer exist. The primary cause of the success in this manufacture has been the peculiar adaptation of American wools for this fabric. This adaptation consists in their spinning qualities, their soundness and elasticity, and the medium fineness, producing the requisite softness, without too much felting quality to cause an undue shrinkage of the goods.

By an examination of a line or series of samples of different grades of English flannels, in comparison with a line of American flannels corresponding in grade and price, it was observed that the English flannels are more highly fulled, and less finished in the face, than the American goods. The American fabrics have the yarns more closely twisted, in order to prevent shrinkage, and the fabric is smoother and more sightly in face. The difference in intrinsic value could not be proven, the different styles being adapted to the tastes of different markets. A large exportation is now being made to Canada.

With the command of their own markets, American manufacturers have adapted their fabrics to the wants of consumers. In 1835 the domett flannels, an original fabric composed of a cotton warp with a filling of wool, came into use as a substitute for the linsey-woolen stuffs, originally of household manufacture, worn by working women for under-petticoats. Having the merit of shrinking but little in washing, it still holds its place as a characteristic American fabric. The red flannels have found a vast consumption among the working population, especially lumbermen and frontiersmen, the pliability of the fabric giving freedom to the limbs. Formerly the red color, less brilliant than now used, was given by a madder dye, subsequently by *lac;* while at present the brilliant and fast scarlet of the cochineal is in almost universal use, the price of cochineal having been reduced to half of its former rate by the introduction of the aniline dyes. The consumption of blue flannels by the army and navy forms another important outlet for this class of fabrics. They form the under-garments for all the men in both services, and the summer undress coats in the former. The regulations of the services require that these flan-

nels should have a twilled weave, and be both wool- and indigo-dyed. The regulations of the Government have tended to keep alive the skill in indigo-dyeing, which, from its costliness, threatened to disappear before cheaper processes. The excellence attained in the army and navy flannels led the way to a more perfected fabric. About 1859 appeared, either through the Middlesex or Washington Mills,—for the honor is claimed by both, and the products of both vie with each other in celebrity,—the blue flannel coating, indigo- and wool-dyed, and having a three-leaved twill. This fabric—sheared and finished like cloth, but retaining the lightness and pliability of the flannel texture, forming an admirable material for summer garments—is distinctly American in origin and character. It has a large domestic consumption, and has become an article of export to South America.

Opera flannels—a name given abroad, from one of its original uses, to a light flannel more highly gigged and finished than the ordinary article, being piece-dyed uniformly, in many fancy colors, and hot-pressed—were first introduced into this country by the Bay State Mills. They have, however, gained their command of the American market principally through the fabrication of a manufacturer of Ware, Massachusetts, now deceased. He commenced the manufacture in 1858, making in that year four thousand pieces. In 1871 his establishment made and sold, of this single fabric, one hundred and twenty thousand pieces, or nearly two million yards. At this time foreign importations of this fabric had entirely ceased. The thorough cleansing of the fabric to receive the dye, and the requisite skill to give the numerous colors and shades desired, are the principal difficulties which the manufacturers have to encounter, single manufacturers keeping all the time a hundred or more distinct shades and colors in stock. American opera flannels were abundantly and tastefully displayed at the Exhibition by several mills. Nothing surpassed them in variety and perfection of hues and shades, except, perhaps, the masterpieces of the French dye-houses,—the exquisite merinos of Rheims and Paris. It is noteworthy that these fabrics are made wholly of American wool, the quality known as XX being used for medium, and picklock (selected from choice flocks) for the finest grades.

American flannels of a still higher grade exhibited were the all-wool gauze and silk-warped flannels. The credit of the introduction of the fine flannel manufacture belongs to the Ballardvale Mills, in Andover, Massachusetts, this mill being the first which made fine yarns by double spinning. In some of these fabrics, made expressly for the Exhibition, there were one hundred and thirty picks to the

inch. The yarns for filling were spun in such fineness that they attained 46,500 yards in length to the pound, the warps reaching 34,500 yards. Among the uses of these fine flannels is their application for lining coffins and for burial shrouds. It is known that the wealthy classes in England, in the last century, rebelled against a law requiring all persons to be buried in flannels. Improvements in manufacture have caused a fabric, which was then obnoxious from its coarseness, to be now specially adapted for burial habiliments, through its softness and fineness.

Another variety of flannel, which has wholly replaced the French fabric formerly largely imported, is the fancy flannel still called French plaid. The fabrics of this variety consist of plaids, or broken plaids and checks, and are dyed in the wool. The great bulk consists in two colors combined, scarlet and white and blue and white. They are largely used for shirts and children's garments. The printed flannels for children, formerly in use, have almost wholly disappeared.

CLASS 237.—Blankets, Robes, and Shawls.

The last observation made under the preceding class also applies to the first article in this class. The American medium or grade merino wools are no less fitted for flannels than for blankets. They compose the raw material of the great bulk of the blankets which enter into our consumption, although noils, from carpet- and combing-wools, are used to some extent. The lowest grades of blankets, composed of shoddy, hair, and the cheapest wool, which are salable abroad, cannot be disposed of here. Even the lowest of our consumers, the savage Indians,—who are supplied with blankets by our Government, according to the statement of one of our colleagues, who is a member of the Indian Peace Commission,—are skillful judges of the quality of blankets. The standard Indian blankets shown at the Exhibition presented all the requisites of a substantial and useful article.

Many mills are exclusively devoted to the production of blankets, principally those of medium qualities for the consumption of the millions. Some Eastern manufacturers, who have made blankets for forty years, have a yearly production exceeding $1,000,000 in value, and one establishment in Minnesota a production of nearly $400,000 annually. The substantial quality of these medium goods, and in some the cleanness of the stock and freedom from grease, were especially noticeable.

No wool fabrics at the Exhibition, of our own production, attracted so much admiration from the foreign Judges as the highest grades of

American blankets. The credit of the introduction of this eminently characteristic fabric is due to the Mission Mills of California, established in 1858. Nothing comparable with these blankets in weight, thickness, softness, and perfection of face had ever before been attempted, and it is impossible to conceive of a more luxurious bed-covering. The beauty of the fabric was not less a matter of surprise to our foreign visitors than the luxurious tastes of a people which could make blankets costing from thirty to fifty dollars a pair salable. The California blankets of this grade are made with a filling of Australian wool, the warps being of California wool. Blankets of no less beauty and perfection were exhibited by a Minnesota mill, and these were made exclusively of wool grown in that State.

Totally different in style and material, but not less admirable, were blankets exhibited by Austria and the Netherlands. Those exhibited by a Netherlands manufacturer were especially noticeable. The wool was of a coarser quality than that used in the California blankets, and the pile of unusual length. They were woven in great variety of colors, and with tasteful designs, in the Jacquard loom, and are highly worthy of imitation by our manufacturers.

An ample field for the application of color is found in the manufacture of rail-car blankets, and especially of carriage, railway, and lap robes. All the European styles of these articles have been adopted here, besides other articles of this class, of still more extensive use, such as the admirable horse-cloths and blankets not long since exclusively furnished by England, which find complete imitation, if not improvement, in our own manufactures.

In the important class of shawls, we naturally observe those most nearly allied in material and texture to the fabrics which we have been considering. The manufacture of the all-wool plaid shawls—formerly known in this country as the Bay State Shawl, from the mill which introduced it—originated in Massachusetts about 1848. Favored by the easy application of the cassimere twill to this fabric, and the facility with which the design is made and varied through the alternate concurrence of the warp and woof, and still further aided by the adaptation of medium American wools to this fabric, it at once attained perfection. The shawls of the Bay State Mills exhibited at the first International Exhibition, that of 1851, were pronounced by French experts as "quite remarkable for the lightness and softness of the stuff;" and shawls exhibited by the same mill at the Paris Exposition of 1867 were commended for the same qualities, as well as for their moderate price. This manufacture has now immense production. Still, the English and Scotch shawls, made of

coarser Cheviot wools, and of a thicker texture, would be preferred for many uses.

No attempts to make the highest qualities of shawls have been made in this country, partly for the same reason that the French, who had perfectly succeeded in making the cashmere shawls, were compelled to abandon the manufacture, because the French ladies preferred an inferior but genuine Indian shawl to a better article of French fabrication. Exquisite shawls, but of precisely the same texture as the Indian shawls, were exhibited by Lyons manufacturers. The material is the finest and most costly Electoral wool. The prices range from $30 to $150. The only rivals of the French in this class of shawls are houses in Vienna, whose products were also exhibited. None but the initiated could determine the difference between these two national products. The French, however, assert that the Austrian products are copied from their own, but that the delicacy of the originals is lost, saying, "One may transplant a tree, but not the soil and the air which give flavor to its fruits." It is asserted that the silky Mauchamp wool, previously mentioned, forms a material for the finest shawls, really surpassing the cashmere of the East.

Admirable shawls made of wool or worsted, in India designs, have become celebrated under the name of Paisley shawls, from the place of their manufacture in Scotland. None of the Scotch shawls of this class were exhibited, but this style of fabrication was represented by shawls of India designs, made by Messrs. Martin Landenberger & Sons, of Philadelphia, the material being American combing-wool. These shawls, well made and in excellent taste, are woven in the power Jacquard loom, at prices so moderate as to insure a large popular consumption.

CLASS 238. — COMBED WOOL FABRICS, WORSTED, YARNS, DRESS GOODS FOR WOMEN'S WEAR. DELAINES, SERGES, POPLINS, MERINOS.

This class includes, with the exception of carpets, all the multitudinous fabrics recognized in England as the products of the worsted industry. It forms the second of the two grand divisions of the wool-industry. Through the variety of its products, the skill demanded in their fabrication, the capital and number of persons employed in the great manufacturing nations of Europe, and the rapidity of its development during the last century, this division has become the most important branch of the woolen manufacture.

So important a class could not fail to be largely represented in an exhibition of the products of the world; but the student of textile

industry was obliged to regret an incompleteness in the series of these fabrics, especially from the two leading nations in this industry,—France and England,—and a deficiency in the labeling of many which were exhibited, so as to show their proper names and composition. We were disappointed in the expectation that the Exhibition would shed full light upon the difficult subject of the nomenclature and composition of the infinite variety of worsted fabrics. We use the word "worsted"—which, although not strictly accurate, is the most convenient English term—to designate the fabrics in question.

To render our future remarks intelligible to unskilled readers, we are compelled to enter at once upon the subject of the names and distinguishing characteristics of worsted fabrics, an inquiry demanded by the popular ignorance on the subject, which prevails to no little extent even among the dealers in the articles in question. In no department of practical knowledge is there so much confusion in the meaning and application of names. The names of the fabrics have rarely any etymological signification. They are usually given arbitrarily by the first introducer of the article, and, if they are successful, become applied to articles quite different from the original fabrics, and especially to imitations in cheaper materials. Fabrics substantially the same are constantly reappearing under different names. It is still possible, though difficult, to obtain some order out of this apparent confusion, and to bring the different varieties of these fabrics into an arrangement which approaches a scientific classification.

The leading basis of this classification is the character of the weave, or, as it is styled by the French, the *armure* of the fabric, the word *armure* signifying the system of harnesses with which the loom is *armed*, or provided, to produce a definite issue. These *armures* consist of four fundamental or classical forms, from which all the varieties of simple tissues are derived. 1. That of *taffeta*. In this, the most simple form of tissue, there are only two harnesses, forming a simple interlacement of the threads of the warp and weft. This is the weave of broadcloth, cotton shirtings and sheetings, and mousselines de laine. 2. The twilled or *Batavia* weave, produced by four harnesses. 3. The *serge* tissue, produced by three harnesses. 4. The *satin* weave, produced by five or more harnesses, the effect of which is to bring the threads of the weft to the face. Different effects are produced from derivatives of these fundamental tissues. Thus, in the most simple,—that of cloth or taffetas,—varied effects are produced by the greater or less torsion of the threads, and the direction in which they are twisted; by variations in the size of the threads of the warp or weft compared with each other; by making the same weft pass alter-

nately over two threads and one thread of the warp, making a "rep" or corded tissue. Still other variations are made by the different materials of the warp and weft, by having them of pure wool and of a single color, or mixed with silk, mohair, or China-grass, or by having the threads printed in different tints. The four fundamental regular interlacements before described, which form the base or ground of even the most complicated tissues, are further varied by having combinations of crossings of the threads which occur at variable places at each course of the thread across the web, forming figured, brocade, or damasked effects, which are produced by the Jacquard loom. Another variation is made by having two warps, one to form the ground of the tissue, and the other made to pass over wires to form a loop, making the velvet or pile fabrics. There are still to be added the highly-important differences of character, equally obvious to the touch and the eye, produced by the character of wool used, whether fine and soft (like merino and cashmere), or hard and lustrous (like English combing-wool and mohair).

These remarks will enable the reader more readily to understand the classification of fabrics condensed from M. Alcan (the highest authority upon this subject), and published in his treatise on working wools, in 1866. As the American importation of worsted dress goods is principally from France, the catalogue is not less valuable because limited to French fabrics. For the same reason the French names are retained.

WORSTED STUFFS OF FINE WOOL.

Names of Stuffs.	Armure.	Warp.	Weft.	Observations.
Manteau	Taffetas	Wool carded.	Wool carded.	
Reps	"	Wool	Fine wool	Made of long-combed wool, and wide for furniture.
Turquoise	Serge	"	Wool	Woven in checks and Scotch plaids, the warp having a serge armure of 2 and 1, and the weft a serge armure of 1 and 2.
Merinos	Batavia or twill on both sides.	Fine wool	"	Made from 8 to 50 picks to the centimetre. Its use universal. Piece-dyed.
Cashmere	Twilled on one side.	"	"	" " " "
Drap d'été	" "	"	"	The warp double.
Mousselines	Taffeta	"	"	
Moulletons	Satin	Wool	"	
Popeline or poplin		Various materials.	English wool.	Poplins are either all wool, or with warps of cotton, silk chappe, or organzine, or fancy printed. The poplin or corded effect produced by the size of the weft.
Barége	Gauze or open taffeta.	Cotton	"	Generally printed.
Challis	" "	Silk grège	Merino wool.	Differs from barége only in the materials.
Grenadine	" "	Silk grège, organzine, or cotton.	English combing-wool.	The weft highly twisted and gas serged; a kind of close barége.
Mozambique	Gauze and taffeta	Cotton	" "	
Crape of Spain	" "	Silk grège	Merino wool.	The same weave as the preceding, but differing in material.
Llanos	" "	Cotton	Mohair, or mixed with silk.	The warp composed of three threads, and is white, while the weft is violet blue, or black, which gives reflections to the stuff.
Grisaille	Taffeta	Cotton chappe or fancy.	English	The warps are printed or *chinés*.
Toile de Saxe	"	Cotton, simple, or double and twisted.	"	Characterized by its peculiar finish.
Circassianne	"	Silk grège	Mohair, or silk and mohair.	
Cretonne	"	Cotton, double and twisted.	Wool	The stuff has a peculiar elasticity, due to the close spinning of the warp.
Jupons	"	Simple cotton	Carded wool.	
Vode	"	Wool		For religieuses.
Valencias	"	Silk chappe	Combed wool.	
Damask	Figured or fancy	Wool or silk	Wool	For furniture.
Bolivar	Taffeta	Wool	"	A light flannel, made in gray or in all varieties of colors.
Alpaga	"	Cotton	Lincoln wool.	
Popeline satin	"	Wool and silk grège.	Knit wool	
Taffetas	"	Silk	Merino wool.	
Biarets	Corded or cannel	Merino wool.	"	
Épinglé	Taffeta and corded	"	"	
Alpine	Serge 2 and 1	Silk	"	
Drap d'Alpes	Serge	Fancy	"	
Anacosti	"	Wool	"	
Batavia	"	"	"	
Epengline	"	Silk	"	
Tamise reps	Corded	Wool	"	
Veloutine	"	Fancy	"	
Drap d'Alma	"	Wool	"	

There are no means of obtaining the names of other French fabrics, or the new names of the same fabrics introduced since the above list was published, except from the dealers in these articles. We have to

thank Messrs. Hovey & Co., of Boston, for a series of samples of French fabrics, with the following names:

Velours	All wool.
Empress	All wool.
Chambery gauze	Silk and goat's hair.
Mousseline de bege	
Cashmere de bege	All wool.
Merino tulle	All wool.
Pongee	Silk and wool.
Mohair glacé	Goat's hair and cotton.
Vigogne	Silk and wool and all wool.
Serge	All wool.
Basket	All wool, fancy.
Matelasse	Silk and wool.
Diagonals	All wool and silk wool.
Imperial silk serge	Silk and wool.
Algerine	All wool.
Armure	Silk and wool.
Turenne cloth	Cotton and wool.
Drap d'Alma	Silk and wool.
Sicilienne	Silk and wool.
Bombazine	Silk and wool.
Tamise	All wool.
Chinchilla	Camel's hair.
Mexican cloth	Silk and wool.
Knickerbockers	Wool with irregular spots of different colors and materials.
French camel's hair	Cashmere goat's wool.
Satine	All wool, with satin weave.
Australian crape	Cotton and wool.
Drap de Nationelle	All wool.
Parametta cloth	Silk and wool.
Henrietta cloth	Silk and wool.
Hernani	Silk and wool.
Damasks, Brocades	Wool, silk and wool, and wool and cotton, in infinite varieties for furniture, woven on the Jacquard loom.

Some of the general features of the French fabrication of dress and furniture stuffs may here be appropriately considered. The influence of the possession by France of Merino wool upon the character of her dress fabrics has already been referred to in this report. In the spinning of fine Merino wools, and weaving them into dress goods, France takes precedence of all nations.

The most important contribution to this success was the invention, by Heilman, of Mulhouse, of a method of mechanical combing, adapted to the short fibres of Merino wool as well as to the long staple formerly regarded as exclusively combing-wool. Mainly through this invention, France, to use Mr. Alcan's words, "marched, in the early

part of this century, with the step of a giant. The means of fabrication were so ameliorated, in the short space of a quarter of a century, that the spinning of Merino wools attained a fineness and regularity once impossible with the best hand-spinning. The machines turned out lengths of yarn of 200,000 metres to the kilogramme, from a kind of wool which, twenty-five years before, would scarcely have produced 50,000 metres; and the price of the unit of weight of an identical article had descended from eighty to fourteen francs, although the prices of labor had increased." Among the exhibits of the house of Auguste Seydoux, illustrating the material from which their famous merinos, cashmeres, and challis are made, were weft yarns of Australian combed wool of the fineness of 109,120 yards to one pound. It is unnecessary to enlarge upon the beauty and perfection of the merinos, cashmeres d'Écosse, and challis exhibited at Philadelphia. They are recognized throughout the world as inimitable, and as exhibiting the most perfect fabrics in the whole range of the textile industry.

Another reason for the French success in these fabrics is the specialization of different branches, and the fabrication of the same article, the spinning, weaving, and finishing forming the three great groups. This division of the fabrication into groups, according to Alcan, "facilitates the labor, concentrates the aptitudes, regulates the production, and contributes to ameliorate the results and the economical conditions. Specialization renders the industry accessible to all,—to moderate fortunes as well as heavy capital." The adoption of this system is now taking place in Philadelphia, with marked beneficial results. Another cause must always give France the pre-eminence. The *arbiter elegantiarum* of the world in the fabrics of taste, she can impose, by her imperial sway upon the followers of fashion throughout the world, the fabrics which she has created, leaving the other nations to supply imitations to the less fastidious masses.

England, who did not do justice to herself by her display of worsted fabrics at Philadelphia, has attained success in another direction. She aims to supply the world with worsted fabrics adapted for the consumption of the million. In extent of production and cheapness of fabrication she leads all other nations. It would be presumptuous to attempt, in the space allotted to this paper, even a sketch of her vast worsted-manufacture, while its characteristics, and the names of its principal fabrics, can be intimated, at least, under the head of our own worsted-manufacture, which is in the main copied from that of England. A feature of some of the higher classes of her worsted fabrics displayed at the Exhibition should not be passed without

notice. With the fashions at present prevailing, there is an extremely limited application of the arts of design in fabrics destined for personal wear. Even the printing of dress goods of wool and mixed materials, which offered a wide field for the application of art, has greatly declined, as the costumes of the present day obtain variety by the use of different hues of plain fabrics. An ample field for the application of art is found in stuffs for furniture, carpets, and hangings for rooms,—the furniture and curtain stuffs of worsted, or worsted and silk. The reps, damasks, and brocades showed the wonderful artistic progress effected by her schools of design and her teachers in practical art, such as Jones, Hulme, Morris, and Dresser. The displays of the Royal School of Art Needlework showed that the highest amateur taste of the kingdom is being brought into the service of the decorative arts, furnishing models and stimulus to the practical manufacturers. Through these influences, the designs for decorative fabrics have a style distinctly recognized as that of the "English school," in which mediæval motives are revived, plant-forms are conventionalized, while the natural treatment of foliage and flowers, and the artificial luxuriance of the *Renaissance* designs, are equally abjured. In the decoration of furniture stuffs of their own style the English are without rivals.

Before proceeding to a sketch of the worsted-manufacture of the United States, which we shall give from purely original inquiries, it will be proper to refer to one of the most important steps in the progress of the worsted-manufacture in this country, to which our own industry owes its importance. All-wool mousselines de laine were perfected in France in 1831. In 1833 a fabric first appeared in France which was a copy of the wool mousselines, with the difference that the warps were made of cotton. The English adopted this manufacture, at Bradford, in 1834–35. No event of the century has done more for female comfort and for the industry of wool than the introduction of the cotton warp. Cotton, instead of being the rival, became the most important auxiliary of wool, and has added vastly to its consumption. The *generic* name of cotton delaines, although now but little used, may be conveniently retained to express the whole class of these fabrics. They are practically the same as a woolen fabric, being so covered with wool that the presence of cotton can be observed only by the closest inspection. Their cheapness and durability make their introduction an invaluable boon to women of moderate means. Their fabrication constitutes the chief feature of the manufacture of the great cities of Bradford, in England, and Roubaix, in France.

THE PRINCIPAL COTTON WARPED, WORSTED FABRICS MADE IN BRADFORD AND THE UNITED STATES.

NAMES.	WEAVE.	WEFT.	WARP.	OBSERVATIONS.
Delaines	Taffeta	Medium wool	Cotton.	Printed.
Barèges	Gauze	"	"	A gauze weave.
Reps	Double-threaded taffeta	"	"	Printed.
C shmeres*	Twilled	XX Merino wool	"	Made in imitation of cashmeres d Écosse, all wool.
Alpaca†	Taffeta	Long-lustre wool	"	Weft originally made of alpaca.
Brilliantine	"	Fine mohair	"	Usually black, the warps dyed before weaving.
Lustres	"	An alpaca of lower grade	"	
Fancy alpaca	"	Figured fancy weave	"	
Brocade	"	A corded ground with a figure	"	
Poplin	"	Long-combing wool	"	A corded effect produced by the size of the warp.
Debaige	"	A fabric with weft of black and white wool mixed	"	
Melange	"	The same, plain	"	
Italian cloths	"		"	

The first attempt to fabricate delaines in the United States was made in a mill at Ballardvale, in the town of Andover and State of Massachusetts, about 1844, by John Marland, agent of the company. It is worthy of note as illustrating (what will hereafter be more conspicuous) how naturally and by direct descent the new industry arose and spread, that the mill at Ballardvale had been organized to make fine flannels, being first to fabricate flannels in the country. The transition was natural to delaines, which, as first made, had much of a flannel character. About 1844 this establishment imported worsted machinery from England and made some delaines for printing and others for dyeing. They also introduced hand-combers, and made their own warps. The wools for the printed delaines were all combed by hand. The goods were first printed by blocks at North Andover, and afterwards on the machines of the Hamilton Manufacturing Company, at Lowell. The fabrication was very successful, although the goods were inferior to those now made. The principal difficulty encountered was that of introducing the fabrics into the American market, which was accomplished only by simulating foreign marks and disguising the boxes, to conceal the domestic source. This mill was subsequently leased to Mr. Jeremiah S. Young, who successfully continued the worsted-manufacture.

The success at Ballardvale induced one of the oldest of the cotton-

* Called "Coburgs" in England.

† Same fabrics originally called in England "Orleans."

manufacturing establishments—the Amoskeag Company, at Manchester, New Hampshire—to try the new fabric. A mill owned by this company at Hookset, in New Hampshire, was devoted to an experimental trial, and Mr. Marland received an interest for conducting the manufacture, which was commenced with about 200 looms. The goods were printed at Greenwich, in Rhode Island. The fabrication was continued at Hookset for six or seven years, with a product of about 38,000 yards per week. The goods sold in the gray at about 14 cents per yard; wool sorts, which now cost 60 cents, costing but 36 cents, and cotton about 10 cents, per pound.

About 1845, certain of the stockholders of the Amoskeag Company organized the company now known as the Manchester Mills, situated in the town of that name, purchased a site and power from the Amoskeag Company, and built an extensive factory expressly for the purpose of making delaines. The cotton warps were originally made at Hookset. The first delaines were made at Manchester by carding, the wool-combers not being introduced until 1855, the Noble comber finally taking the place of the inferior combers of American invention first used. This company continued to improve its machinery and enlarge its production, which now reaches 250,000 pieces annually, of fifty yards each, the products having a reputation equal to that of any in the market.

The Hamilton Woolen Company, at Southbridge, Massachusetts, was originally established for the manufacture of cloths. About 1845 the leading stockholders of this company, who had been selling agents of the Amoskeag Company, seeing the success at Hookset, resolved upon converting the mill at Southbridge into a worsted-factory. It met at first with little success, until its management was undertaken by Mr. Ballard, in 1846, who is still the treasurer of the company. The products of this mill, in printed delaines and reps, received deserved commendation at the Exhibition.

The line of descent in our worsted-manufacture, which we have traced from the establishment at Ballardvale, was continued in the Pacific Mills, its first treasurer and the constructor of its works being Mr. Young, before referred to, a brother-in-law of Mr. Marland, who had gained his practical experience at Ballardvale. As this establishment is the largest in this country, and, as it is believed, in the world, where all the branches of the worsted fabrication are carried on within the walls of a single proprietorship, its exceptional importance will justify a somewhat extended notice of its history and operations.

The Pacific Mills are situated in Lawrence, Massachusetts, on the Merrimac River, twenty-six miles from Boston. The enterprise was

started by the Essex Company, Mr. Abbott Lawrence being president and Mr. Young treasurer of the company. It was incorporated in 1853, under its present name, with a capital of $2,000,000, for the purpose of making ladies' dress goods from wool wholly, from cotton wholly, and from wool and cotton combined; and was provided with all the appliances of manufacture, including print- and dye-works. The construction of the works having exceeded the amount of capital paid in, the establishment found itself, in the very first years of its existence, on the brink of failure. This failure was arrested by the munificence of Mr. Abbott Lawrence, who, on his private responsibility, advanced several hundred thousand dollars to meet the emergencies of the mill, thus adding to his title for recognition as one of the great founders of the manufactures of New England. A hardly less important work of Mr. Lawrence was securing for the treasurership of the mills, vacated through the declining health of Mr. Young, the services of Mr. J. Wiley Edmands, who had been educated in his house. Mr. Edmands took the treasurership and the responsible management of the mills in June, 1855. For the subsequent two or three years, the establishment, although actually making money, was only sustained by borrowing largely. In 1857 the leading commission houses of New England succumbed under the pressure of the well-known panic of that period. The Pacific Mills were compelled to ask an extension of credit for six months, to which every creditor assented. In 1858 the stockholders were called upon to furnish an additional capital of $500,000, of which all but $75,000 was secured. The stock representing this amount, not secured, was sold at public auction, in 1859, at from $1320 to $1342 per share, the par value being $1000; although, in 1857, two years previously, many shares had been sold at prices ranging from $75 to $200. During the first year of the war, 1861, the mills lost money, the product then being about 11,000,000 yards of dress goods, cotton and woolen. In 1870 the product reached 45,000,000 yards; and, for several years since that date, the annual sales, including the cloths purchased for printing, have reached about 65,000,000 yards. Of this, about sixty per cent. are stuff or worsted goods. Estimating our population at 45,000,000, and that one-third of this population (15,000,000) consists of women and girls, the Pacific Mills, which have all their consumption at home, supply not less than four yards of dress goods to each person of our population wearing these fabrics.

The following statistics of this establishment will give a better idea of the magnitude of its operations:

Number of mills and buildings	12
Acres of flooring in buildings	41
Cotton spindles	135,000
Worsted spindles	25,000
Number of looms	4,500
Pounds cotton used per week	116,000
Pounds fleece wool used per week	65,000
Yards of cloth printed or dyed per week, more than	1,000,000
Printing-machines,—from two to sixteen colors	24
Tons of coal used per year	23,000
Number of steam-boilers in all (32,000 horse-power)	50
Number of steam-engines (1200 horse-power)	37
Number of turbine-wheels (2000 horse-power)	11
Cost of gas per year (5000 burners)	$35,000
Cost of labor per month	$160,000
Average daily earnings, women and girls	98 cents.
Average daily earnings, men and boys	$1.40
Persons employed, women and girls, 3534 Persons employed, men and boys, 1766	5,300
Number of houses for work-people	275

To this it may be added, that the raw materials for dyeing and printing require an annual expenditure of $400,000; the consumption of potato starch is 500 tons a year, or the product of 125,000 bushels of potatoes; the wool consumed requires the fleeces of 10,000 sheep each week; while to all these are to be added the food and clothing of 5300 operatives, and their dependants (at least twice as many more), and the items of transportation of raw material and manufactured products.

The company has never ceased its care for the welfare of its operatives, and their improvement morally and intellectually. It early founded a library, with reading-rooms, which contains nearly seven thousand volumes, and is open to the work-people and their families, and has actually an average of seven hundred daily readers. It has established a relief society for work-people temporarily ill, to which the operatives and the company contribute, as well as a "Home," or hospital, provided with physicians and matrons, where those seriously ill can be better provided for than in the boarding-houses of the company, or even in their own homes. As the result of this recognition by the company of its moral responsibilities, there has been no disposition on the part of its operatives to organize strikes, all difficulties which have arisen having been amicably arranged. This moral work of the company was suitably recognized at the Paris Exposition of 1867, by the tribute to the company of one of the ten awards granted, among five hundred contestants, to the individuals or associations "who in a series of years had accomplished the most to secure har-

mony between employers and their work-people, and most successfully advanced their material, intellectual, and moral welfare."

This mill has been selected as illustrative of our highest achievements in the department to which it belongs. We would by no means have it inferred that its products are superior to those of mills of less magnitude. The Manchester Mills, with an annual product of dress goods of 250,000 pieces of fifty yards each; the Hamilton Woolen Company, with a product of 800,000 pieces, and the Washington Mills, with a product of 2,000,000 pieces, manufacture worsted fabrics of no less excellence. It is due to the last establishment to say, that it was the first in this country to manufacture certain all-wool dress fabrics formerly obtained exclusively from France. Some of these fabrics which it was the first to introduce, such as the all-wool matelasses, are made not only by this establishment, but by Messrs. Martin Landenberger & Co. and Thomas Dolan & Co., of Philadelphia, and have high repute in our markets.

A very important class of dress fabrics was not undertaken in this country until 1872,—that of black alpacas, mohairs, and brilliantines. It was, not long since, believed that these goods could not be successfully made elsewhere than in Bradford, England. The Arlington Mills, of Lawrence, Massachusetts, were the first in this country to overcome the difficulties of this fabrication, and have since made a specialty of this branch of manufacture; these goods forming a large part of their annual production of five million yards. The black alpacas, mohairs, and brilliantines exhibited in great variety by this company, as well as by the Farr Alpaca Company, of Holyoke, were fabrics equal in all respects to the productions of the best manufacturers in the old-established seats of the worsted-industry in Europe.

Reference must be made to other worsted fabrics not included in the category of dress goods.

The manufacture of lastings, which are made from long-combing wools of English blood, has until recently been regarded as an exclusive English monopoly, and the English lastings at the Exhibition well sustained their traditional reputation. All attempts in this country failed until after 1867, when the Lowell Manufacturing Company first successfully achieved the fabrication of this article. They were followed by the Peacedale Manufacturing Company, of Rhode Island, and others; and at present the American shoe-manufacturers are largely supplied by lastings of domestic production.

Before the late war, English bunting, made like lastings of long-combing wools, formed the sole material for our national flags. The United States Bunting Company, of Lowell, first successfully achieved

the manufacture of bunting. Its exhibits at Philadelphia showed not only excellent fabrics in bunting and moreens, but a marked improvement in the construction of the national flags.

In tapestries and upholstery stuffs of worsted or worsted mixed with cotton and silk, there was but one prominent American exhibition,—that made by Messrs. Kelty & Co., of New York; but this, in tastefulness of design and excellence of fabrication, was encouraging as to our future success in this attractive department.

CLASS 239.—CARPETS, RUGS, ETC.—BRUSSELS, WILTON, TAPESTRY BRUSSELS, AND VELVETS, AXMINSTER, VENETIAN, INGRAIN, FELTED CARPETS, DRUGGETS, RUGS, ETC.

Among the surroundings of our homes there are none which bring so palpably before our eyes the arts of design of remote centuries and distant peoples as carpets. Originating in Persia at a period almost on the verge of history, and among a people of the ancient Aryan stock, among whose descendants in the centre, south, and east of that country are found the present chief seats of the textile industry of Persia, the carpet-manufacture was carried from thence to India, and to Arabia and Turkey. Carpets were introduced into Europe by the Crusades. Their manufacture in Europe was first undertaken in France, under the patronage of Henry IV.; and the manufacturing of carpets, under royal patronage, was founded at Beauvais, by Colbert, and still exists. Carpets in Europe, like china or porcelain, descended to the homes of the people from palaces, and the influence of original designs for royal establishments may still be seen in the gorgeous patterns of French carpets.

There were ample opportunities at the Exhibition for studying this, the most attractive department in the whole range of the textile industry, as it is the only one in which the arts of design have still unrestricted sway, and where the value of the fabric is controlled mainly by artistic considerations. Persia, India, Turkey, France, Germany, Austria, England, Scotland, and the United States, each exhibited its characteristic fabrics, and no important national product or variety of fabric in this department was without representation. We will briefly refer to the different national products, arranging them in the order of their origin, and availing ourselves of the artistic suggestions of Redgrave, Dresser, and Major R. Murdock Smith, under the light of whose illustrations they were observed.

The carpets of Persia first claim notice, specimens of which were supplied by Messrs. Sloane, of New York, our observation having been enlarged by a study of Persian carpets and rugs directly imported

by them, making a museum of Persian art in this department not surpassed by the collection at Kensington.

The Persian carpets, or rather rugs, are made chiefly in Kurdistan, Khorassan, Feraghan, and Kerman (our principal authority for these statements being the notes on Persian art by Major R. Murdock Smith, R.E.), each district producing a distinctive kind in texture and style. The finest are those of Kurdistan. In these carpets the pattern does not represent flowers, bouquets, or other objects, thrown up in relief from a uniform ground, like so many of the inappropriate designs of Europe, but looks more like a layer of flowers strewn on the ground, or a field of wild-flowers in spring. The borders are always well marked, and usually of brighter colors than the centre.

Besides the ordinary "Kali," or pile carpet, others called "Do-ru" are made at Kurdistan. These are smooth, without pile, and alike on both sides, and are used in traveling for spreading upon the ground.

The carpets of Feraghan resemble those of Kurdistan in style, although the texture is looser and the pattern simpler. They are, consequently, cheaper and in more general use. Fine Kurdistan carpets cost from three to four pounds per square yard. The Feraghan carpets cost from fifteen to eighteen shillings.

The Khorassan carpets are somewhat superior in texture to those of Feraghan, but the patterns are usually more realistic. Kerman carpets are next in value to those of Kurdistan, but the designs are usually still more realistic than those of Khorassan. Besides flowers, figures of men and animals are not uncommon.

According to Major Smith, the carpets of every description are made without even the simplest machinery, the loom being simply a frame on which the work is stretched. The woof consists of short threads woven into the warp by the fingers, without a shuttle. When a row of the woof is thus completed, a sort of comb is inserted into the warp and pressed or hammered against the loose rows of woof yarns until they are sufficiently tightened to the rest of the web. The pile is formed by merely clipping the ends of the woof until an even surface is obtained. The weaver sits with the reversed side of the web towards him; so that he depends solely upon his memory for the formation of the pattern.

The Persian carpets are usually somewhat long and narrow,—a form adopted because more easily woven, while it is adapted to the usual narrow dimensions of the Persian houses. The space for carpets on the floor of these Persian apartments is still further narrowed by the habit of laying strips of felt at the upper end and along the sides of the room, the narrow carpet occupying the middle space.

The spreading of Oriental rugs upon plain felt carpets, now somewhat in vogue, is an unconscious adoption of Persian fashions.

In an artistic point of view, the Persian carpets show an excellence so marked that the educated observer cannot have a moment's doubt as to their superiority over all other Oriental products of their class. They are distinguished by their subdued tones and the harmonies of their various colors. Various as they are, there are certain forms repeated in all designs, so that the national characteristics are clearly marked to those familiar with them.

Indian carpets (some beautiful specimens of which were shown in the Exhibition) are made in large single pieces adapted for covering floors of considerable space. Those exhibited, remarkably illustrated the characteristics of design pointed out by Mr. Redgrave. They had a great variety of colors, but so evenly distributed, and each so well balanced by its complementary and harmonizing hue, that the general effect was rich and agreeable. The effect at a distance was a somewhat foxy tone, in consequence of the free admission of warm neutrals, as brown and brownish purple; white and yellow are but sparingly introduced to define the geometrical arrangement of the forms. The forms consisted largely of highly conventionalized flowers and plant motives, all geometrically constructed. These carpets were much more agreeable in tone than the real Turkey carpets at present so much in vogue.

The Turkish or Smyrna carpets, which were well illustrated, in the best specimens are generally designed with a flat (that is, without perspective) border of flowers of the natural size, and with a centre of larger plant-forms conventionalized, often to such an extent as to obscure the forms. The colors are negative shades of a medium or half tint, as regards light, and tending rather to dark, with scarcely any contrast, and therefore a little sombre in character. Three hues largely pervade the surface,—green, red, and blue. These are not pure, but negative, so that the general effect is cool, though rich. These remarks refer to the best types of the Smyrna carpets. There are others, especially such as are now so extensively imported and sold at auction in our principal cities, which are marked by violent contrasts,—a predominance of yellows and harsh violets. This deterioration may be accounted for by the fact that many carpets are now made in special manufactories, and that the modern carpets do not exhibit the traditional and inherited taste found in the ancient household fabrication.

It is certain that by far the best specimens of the pure Turkish style are found in what are called the Smyrna styles, made in large estab-

lishments in Germany and the Netherlands. Among them, the large carpets and smaller rugs made by the Royal Carpet Company of Deventer, Netherlands, were conspicuous for the taste of their designs, and chasteness as well as richness of color. Nothing more fitting for the repose of a library could be desired than one of these carpets. As they are made by hand, the high price of labor in this country will not admit of their fabrication here. In looking at the best types of all the Oriental carpets, we cannot fail to be struck with the wisdom displayed by the Orientals in adopting negative tones for decorating the floors of their apartments. No people exhibit greater richness of upholstery and costume than those of Persia and India. In the subdued colors of their carpets, they have adopted the best means for enhancing and supporting the splendors of their furniture and the richness of their personal decorations.

The French carpets were represented by magnificent Axminsters, woven for large rooms, in a single piece. The most conspicuous was one representing a wonderful exuberance of tropical forms, in birds, flowers, and foliage; this fabric admitting the employment of an unlimited variety of hues, tones, and shades. The spectator, however, could not fail to be impressed with the thought that it was better fitted to be hung, as it was, as a drapery for a vast hall, than to be seen horizontally, and trodden under foot. This same impression was given by the Aubusson carpets, than which no fabric of wool can be intrinsically more perfect as works of art. They are, in fact, but tapestries for floors, and are fitted only for palaces or rooms decorated and furnished in the luxurious style of the *Renaissance*. Even here they would seem to detract from the splendors of paintings and decorations adorning the walls. It seems difficult to eradicate the old ideas of florid decoration from French designers. It is a curious fact that the English now find in France the readiest sale for carpets designed under the influence of the modern English schools of art.

It would be useless to describe what is so well known,—the character of English and Scotch Jacquard Brussels, Wilton tapestry, and Axminster carpets exhibited, and it would be presumptuous to praise them. It is enough to say that they, as a matter of course, proved themselves to be, in texture and design, the worthiest models for our own manufacturers to imitate, and, if possible, to surpass. The observer could not fail to be amused by the singular mistake made by some of the largest English exhibitors, in displaying fabrics designed for adaptation to their own conceptions of American tastes. They seem not to have been aware that representations of lions, tigers, architectural panels, and huge bouquets are as offensive to the American

as to the English educated eye. Recognizing this mistake, an eminent English carpet-manufacturer remarked to one of our own at the Exhibition, "We seem to be playing at cross-purposes; while we are manufacturing for the supposed American taste, you manufacture for our own."

The carpet-manufacture of the United States has become so characteristic a feature of the American textile industry, that this report would be incomplete without a brief sketch of the steps by which it has reached its vast development. In the middle of the last century, a carpet was regarded as a curiosity in our most luxurious city of that period, Philadelphia; but, as early as 1791, a carpet-manufactory was established by Mr. William Sprague, which attracted so much attention as to induce Mr. Hamilton, in his famous report on manufactures, of that date, to recommend a duty on imported carpets, as an encouragement to home industry. The census of 1810 has been referred to as an authority for the statement that, in that year, 9984 yards of carpet and coverlid, worth $7500, were made in Philadelphia. The value indicates either the small proportion of carpets made or their very low value. No exact dates as to the further extension of this manufacture appear until 1825, at which time it seems that Mr. Alexander Wright, a native of Scotland,—who with others had previously started a small establishment for making carpets in Medway, Massachusetts,—visited a small carpet-factory in Philadelphia to learn the mysteries of the art. Meeting with no success, he went to Scotland, where he purchased looms, with which he returned to this country, accompanied by Glaude and William Wilson, who were employed by him to aid in operating his machinery, and who subsequently made considerable improvements in the Jacquard attachments to carpet-looms. The location of the works not being favorable, the property was sold to Mr. Frederick Cabot and Mr. Patrick T. Jackson, well known as among the founders of the cotton-manufacture of New England. In 1828, Messrs. Cabot & Jackson sold the mill and machinery at Medway to the Lowell Manufacturing Company, which had been recently organized for the manufacture of carpets and cotton goods, the carpet machinery in the mean time being kept in operation until the mill at Lowell was completed. It should be observed that carpet-weaving at Medway, as well as that first undertaken at Lowell, was done on hand-looms.

It is within the personal recollection of the writer, that at about this time the manufacture of ingrain carpets was undertaken at Great Falls, in New Hampshire, by power, the apparatus for making the figure automatically being a large cylinder or drum, upon which pins

or blocks were placed corresponding to the pattern to be woven, the cylinder operating like that of a music-box. This apparatus was also used at Little Falls, in New Jersey. This, as well as other automatic devices tried elsewhere, was finally abandoned, as operating less favorably than the hand-loom. In 1844 the hand-loom, both in Europe and this country, was universally used for making carpets.

The system was revolutionized by an American invention, which marks the period of its introduction as the most important epoch in the whole history of the carpet-manufacture. Mr. E. B. Bigelow, of Boston, Massachusetts, in 1842, conceived a series of devices for making the carpet-loom automatic, so that the costly labor of men might be dispensed with, and the whole process of weaving might be conducted by women or boys. After applying in vain to several parties engaged in the manufacture for the pecuniary means necessary for the costly experiment which he proposed, he succeeded in gaining the attention of Mr. George W. Lyman, treasurer of the Lowell Manufacturing Company, through whose influence the construction of an establishment with the newly-invented machinery was undertaken by the company, at a cost of many hundred thousand dollars. Mr. Bigelow was also seconded by Mr. Wright, the superintendent of the company, in the practical details of the adaptation of the invention. In 1845 the successful weaving of ingrain carpets by power had been demonstrated at Lowell, and its ultimate general use had become a fixed necessity of the manufacture.

Since this successful experiment at Lowell, the manufacture of ingrain carpets in this country has been marked by a constantly extending development. The important establishment at Thomsonville, Connecticut, now known as the Hartford Carpet Company, which used hand-looms concurrently with the Lowell Company, adopted Mr. Bigelow's invention. Each of these two is unsurpassed by any in the world making similar products, in the amount of production and excellence of fabrics; while many more recent and smaller establishments have their special excellences of fabric.

The patents for the inventions of weaving Jacquard Brussels and Wilton carpets, although offered to the Lowell Company, were not accepted, and it became necessary, finally, for Mr. Bigelow to utilize his own inventions. The result was the establishment of a factory at Clintonville, now Clinton, Massachusetts, in 1848, which was operated with success; and ultimately, of the organization, in 1854, of the Bigelow Carpet Company, which became the possessor of the works and franchise of the concern just mentioned. This establishment, the growth of more than a quarter of a century, is now the largest in the

world for the manufacture of Jacquard Brussels and Wilton carpets, in which the several processes of worsted spinning, dyeing, and weaving are united in one concern.

The American claim to the honor of this achievement of inventing the power-loom for weaving Jacquard Brussels and Wilton carpets is fixed by foreign recognition. The supplementary report of the jury at the World's Fair in London, 1851, where the inventor's carpets were exhibited, says,—

"The specimens of Brussels carpeting exhibited by Mr. Bigelow, woven by a power-loom invented and patented by him, are better and more perfectly woven than any hand-loom goods that have come under the notice of the jury. This, however, is but a small part of their merit, or rather that of Mr. Bigelow, who has completely triumphed over the numerous obstacles that presented themselves, and succeeded in substituting steam-power for manual labor in the manufacture of fine-frame Brussels carpets. Several patents have been taken out by different inventors in this country [Great Britain] for effecting the same object. But as yet none of them have been brought into successful or extensive operation; and the honor of this achievement, one of great practical difficulty as well as of great commercial value, must be awarded to a native of the United States."

Axminster carpets, adapted only for the most luxurious use, until recently made exclusively in France and England, are still woven in those countries on hand-looms. A patent for weaving these carpets by power, the invention of Alexander Smith and Halcyon Skinner, of New York, was granted in 1856. On account of the civil war, and the destruction by fire of the establishment where the invention was first applied, it did not come into considerable use before 1867, when the factory was rebuilt and the machinery set at work. The product of the establishment under the proprietorship of Alexander Smith & Sons is about 200,000 yards a year,—an amount believed to be equal to the entire annual production of the same kind of goods in France, and more than is made in Great Britain. One of these power-looms, attended by one competent woman, will produce in a day an amount equal to the product of ten English or French hand-looms, attended by as many men. The loom is not adapted for weaving the wide, single-piece carpets made in the foreign hand-looms; but this inconvenience is almost wholly obviated by the perfect selvage and matching of the figures of the narrow pieces, which may also be applied to floors of any dimensions.

Tapestry carpets, known as tapestry Brussels and tapestry velvets, form a very important branch of the carpet-manufacture of England

and the United States. This style of carpet, of quite recent invention, is particularly adapted to the popular demand for brilliant effects at moderate prices, for there is no form of carpet in which so good an appearance can be secured at so low a cost. In all other carpets the yarns are dyed. The principle of the fabrication of these carpets consists in *printing* the colors upon the warps in such a manner that when the warps are woven they form the desired figure. In this style of carpet the room for the application of color and design is unlimited.

The method of printing the warps, which constitutes the essential feature of the tapestry carpets, was the invention of Mr. Whitock, of Edinburgh, Scotland, about 1838. The invention met with little success until the right to apply it in England was secured by Mr. John Crossley, of Halifax, England, about 1842. With his characteristic energy and skill he made the fabrication a perfect success, and the establishment founded by him still makes the largest production of this fabric of any in the world.

In 1846, Mr. John Johnson, an Englishman, educated in Crossley's establishment, and who had himself put up the first machinery for this branch of fabrication at Halifax, came to this country, and established the manufacture of tapestry carpets at Newark, New Jersey, running about twenty-five hand-looms. He was facilitated in his enterprise here by the fact that Whitock had taken out no patents in this country. Mr. Johnson subsequently removed his establishment to Troy, New York, where the manufacture was carried on for two or three years under his direction, though not in his name. In the autumn of 1855 the machinery was purchased by a company, of which Mr. M. H. Simpson was the principal stockholder, and removed to Roxbury, Massachusetts, in 1856. The great inventive power of Mr. Simpson, seconded by the experience of Mr. Johnson, has secured for the Roxbury Carpet Company the prominence in this manufacture displayed by its beautiful fabrics at the Exhibition. This company has by no means the monopoly of this manufacture in this country. Its claims for excellence are contested by Messrs. Higgins & Co., of New York; Alexander Smith & Sons, of Yonkers; Stephen Sanford, of Amsterdam, New Jersey; Messrs. Dobson, of Philadelphia; and others.

The progress made in the manufacture since its first introduction is remarkable. The product of the first hand-looms was but five yards per loom per day. In 1856 the product of the Roxbury Carpet Company for each loom per day was sixteen yards. At present the average product of each of the one hundred and fourteen looms employed

is forty-nine and a half yards per day. This is largely due to the invention of the power-loom of Mr. Bigelow, the principles of whose inventions are applied in weaving these fabrics.

Particular reference has hitherto been made only to the carpet-manufacture of New England and New York, which is characterized by its few vast establishments. The city of Philadelphia, alone, surpasses all other parts of the country combined in the extent and variety of the carpets which issue from its looms. A prominent characteristic of the Philadelphia manufacture is the diffusion of the industry in small establishments. Philadelphia, with its cheap homes, its abundant and cheap market, and the faculty which it seems to possess above all other cities of appropriating the talents of the artisans who resort to it, is the paradise of the skilled workman. There, as nowhere else in this country, the loom of the handicraft carpet-weaver still finds abundant occupation through the smaller manufacturers, who employ his skill, and furnish the raw material to be worked up by the weaver and his family in their own houses. The carpet-manufacture of Philadelphia is distinguished for its success in making sightly and useful carpets out of cheap materials, adapted for the most modest homes, and its carpet-makers are among the few American manufacturers who have been able to profitably export their products.

While small establishments form the rule in the carpet-manufacture of this city, there is one under an individual proprietorship of comparatively recent foundation,—that of Messrs. John & James Dobson,—which employs between two and three thousand workmen, principally in carpets. There are also notable exceptions to the general rule of manufacturing the cheaper products, Messrs. McCallum, Crease, & Sloane having exhibited ingrain carpets of the highest class (which, in design and fabrication, compared favorably with the best in the Exhibition), and the Messrs. Bromley, Venetian carpets illustrating the best merits of that class.

We have not attempted, in any other department, to exhibit the present amount of production; but the carpet-manufacture is so prominent a feature of our textile industry that we have taken pains to obtain, from original sources, the amount of production in 1875.

The Carpet Association of Philadelphia has furnished Mr. Lorin Blodgett, for his work on the industries of that city, the statistics of its carpet-manufacture in 1875. The report for 1875 claims the total value of the carpets manufactured in that city to be $19,000,000, and that the increase of machinery since 1869, in the form of mills, steam-power looms, etc., was more than one hundred per cent. Returns

furnished to us by the following establishments outside of Philadelphia, viz., the Bigelow Carpet Company, the Hartford Carpet Company, E. S. Higgins & Co., the Lowell Manufacturing Company, and the Roxbury Carpet Company, show that the actual value of carpets made by these companies was $11,126,168. We feel authorized in estimating the product of other mills out of Philadelphia, not enumerated, at $2,000,000.

RÉSUMÉ OF AMERICAN PRODUCT IN 1875.

In Philadelphia	$19,000,000
Other mills enumerated	11,376,168
Not enumerated	2,000,000
Total value of American production of carpets in 1875	$32,376,168

The principal exhibitors of American carpets, by displaying them together in a series of alcoves, made their united exhibits in this department unusually imposing, and the proofs of our attainments in this manufacture were observed with no little surprise. It was manifest, from the absence of rival foreign exhibitors, that, in respect to the carpets of the cheaper and medium qualities, up to two- and three-ply ingrains, the competition is confined to our own manufacturers. Even rival English manufacturers generously admitted that, in the production of Jacquard Brussels, tapestries, Wiltons, and narrow Axminsters, we have nothing to learn from them either in design or fabrication.

CLASS 240.—Hair, Alpaca, Goat's Hair, and other Fabrics, mixed or unmixed with Wool.

Of the materials other than wool proper composing fabrics, but ranked with it because possessing the same general properties, the first in value is the product of the goat of Thibet, commonly called the Cashmere goat,—a distinct variety inhabiting the elevated regions north of the Himalayas. This variety, whose origin is obscure, has affinities with the Angora race. Its size is quite large. The horns are flattened, straight, and black, and slightly divergent at the extremities. The ears are large, flat, and pendent. The exterior fleece or hair, which is long, silky, and lustrous, is divided on the back, and falls down upon the flanks in wavy masses. Beneath the hair, there is developed in autumn a short and exceedingly fine down, called *pushm*, from which the cashmere shawls are fabricated. The quantity of pushm obtained from a single animal is quite small, never exceeding one hundred and eight grammes, and usually much less, to the individual. The separation of the kemp or coarse hair from the

pushm, which is indispensable for making the shawl-yarns, is a work of great labor. The raw or unprepared pushm, it is said, costs in India about seventy-five cents per pound; but the labor of separating the kemp, at the low rate of four cents a day, is so great as to bring the cost of the pure pushm up to seven or eight dollars per pound.

Well-arranged specimens of the pushm, as well as magnificent samples of the shawls fabricated from this material, were shown in the India collections. One in the Exhibition, imported by an English house, was valued at $1137. The prices of shawls, actually of Indian fabrication, descend as low as $20. The inferior shawls are made in Kerman, in Persia, as well as in India, from the material called "koork," proceeding from a particular kind of white goat, distinct from the Thibetian animal. Numerous flocks of these goats are kept at Kerman. They are cultivated in the same manner as the Merinos formerly were in Spain, being *transhumant*,—or feeding in the valleys in winter, and on the distant mountain-plateaus in summer. A large part of the Kerman koork is annually exported to Upper India, where it is manufactured into false India shawls. It is the koork, and not the pure cashmere pushm, as is commonly supposed, which forms the material of the richest of the Persian carpets, a magnificent specimen of which is in the collection of the Boston Art Museum; and an inferior one from Khorassan, now in Messrs. Sloane's warehouse in New York, although but six feet by four in size, is valued at $275.

The fabrication of cashmere shawls in Europe has been attempted only by the French. The peculiar Indian texture called "espouline" was perfectly achieved in Paris in 1834, four thousand workmen being employed, while some four hundred goats were imported from Thibet. But it was found that the raw material, expensive as it is, formed not more than one-tenth of the cost of a shawl; that the French workman could not compete with the Indian weaver, working at less than one-fifth of his wages; and that ladies of fashion would pay twice as much for a genuine India shawl as for a French article really superior in texture and design. The manufacture has, therefore, been abandoned. Since the monopoly of the East India Company has ceased, the French have reconciled themselves to the loss of this manufacture by making Paris the principal *entrepôt* in Europe of the India shawl trade. The inferior pushm or koork, from which the kemp is not separated, is at present largely used by the French in the fabrication of cashmere dress fabrics.

The next analogous material, in value and importance, occupying the place of wool, is mohair,—the product of the Angora goat. As this material could not be properly discussed under the head of wool,

in the first part of this report,—while it is rapidly becoming an important object of American production,—it may not inappropriately receive consideration in this connection.

The Angora goat (descended, as proved by modern naturalists, from a distinct wild species of Thibet,—the Falconer's goat, *Caprus Falconeri*), it is supposed, was carried by the migration of pastoral tribes from Thibet, in the eleventh and thirteenth centuries, to the country in Asia Minor near Angora,—the ancient Ancyra,—where they principally abound, and from which the recent diffusion has taken place. Their existence was not made known to Europe until 1655, and the first full description of them was given by the celebrated botanist Tournefort, the master of Linnæus. But so little was popularly known of them, that some of the old dictionaries define mohair as the hair of a Turkish dog. The chief supply for commerce still comes from Asia Minor, the country being in the Turkish territory. The superbly mounted specimens of these animals in the Turkish department must be remembered by all visitors at the Exhibition.

The many attempts made to acclimate the Angora goat in various parts of Europe have met with signal failure, the generally prevailing moist climate being unlike that of their native habitat. The first importation into the United States, consisting of eight animals from Asia Minor, was made in 1849, by Dr. J. P. Davis. Other importations were made by Mr. Diehl. These and their descendants were distributed principally in the Southern States. Mr. Winthrop W. Chenery, of Belmont, Massachusetts, an eminent merchant and stock-raiser, imported about three hundred pure-blood animals, and introduced the first full-blooded animals of this race into California. Mr. A. Eutichides, a native of Greece, came to this country from Asia Minor in 1869, bringing a flock of Angora goats with him. A part of this flock was sent to California; the rest of the flock, numbering fifty-four, in 1875, is now in the possession of Mr. F. S. Fulmer, of Spring Mills, Appomattox County, Virginia, and has been kept perfectly pure. A flock of several thousand pure and grade animals of this race is upon an island in California, and several thousand are stated to be scattered through Oregon. The acclimation of the race, so difficult elsewhere, has been perfectly accomplished in the comparatively dry climate of this country, especially in the high regions of the South and the interior. The only obstacle to success is the greediness of breeders, who are too apt to sell grade animals for breeding purposes. It is only by the constant use of absolutely pure bucks that merchantable mohair can be procured. For further information on this subject the reader is referred to a monograph on the *Angora*

Goat, its Origin, Culture, and Products, by the writer, published in vol. xi. of the *Proceedings of the Boston Natural History Society*, and in vol. vi. of the *United States Reports of the Exposition at Paris, of 1867.*

Mohair, the fleece of the Angora goat, is not a mere substitute for wool, but occupies its own place in the textile fabrics. It has the aspect, feel, and lustre of silk, without its suppleness. It differs materially from wool in the want of the felting quality; so that the stuffs made of it have the fibres distinctly separated, and are always brilliant. On account of the stiffness of the fibre, it is rarely woven alone; that is, when it is used for the filling, the warp is usually of cotton, silk, or wool, or the reverse. The distinguishing qualities of the fibre are lustre, elasticity, and wonderful durability. The qualities of lustre and durability, particularly, fit this material for its chief use, —the manufacture of Utrecht velvets, commonly called "furniture plush," the finest qualities of which are composed principally of mohair, the pile being formed of mohair warps, which are cut in the same manner as silk warps in velvet. Upon passing the finger lightly over the best Utrecht velvets, the rigidity and elasticity of the fibre will be distinctly perceived. The fibre springs back to its original uprightness when the pressure is removed. The best mohair plushes are almost indestructible, and are now in general use by all the principal railroads, as the most enduring of all coverings for railroad seats. The English have attained the greatest success in spinning mohair, and the French and German manufacturers use English yarns. In the manufacture of Utrecht velvets, the city of Amiens, in France, holds a marked precedence, and the plushes exhibited by her manufacturers, in Philadelphia, of all hues, plain and figured, well sustained her reputation. Another analogous application of mohair is for forming the pile of imitation seal-skins. Some of these fabrics, exhibited by manufacturers of Huddersfield, England, were of special beauty, the resemblance to real fur being quite striking. Admirable imitations in mohair of the Astrakhan lamb-skin furs were exhibited by the same manufacturers. Similar goods, made by one of our associate Judges, Dr. Weigert,—who, by his position, was precluded from an award,—received high commendation. Mohair forms an essential material in the best carriage and lap robes, with a long and lustrous pile. Some exhibited were made to resemble the skins of tigers, leopards, and other animals; and others were printed. Among the last, some made by a manufacturer in Sandford, Maine, were conspicuous for excellent texture and design. Another application of mohair is for the fabrication of braids for binding, which have the lustre of silk, but far greater durability. Excellent specimens of this

fabrication were exhibited by T. M. Dale, of Newark, New Jersey. Still another important application of this material is in the fabrication of black dress goods, resembling alpacas, the mohair being woven with cotton warps. They are called mohair lustres, or brilliantines. Beautiful exhibits of this admirable fabric were made by the Arlington Mills and the Farr Alpaca Company. Mohair is also used in France in the manufacture of laces, which are substituted for the silk laces of Valenciennes and Chantilly. These, however, do not come within the consideration of this group.

The soft fibre of the vicuña of South America, composing fabrics which are peculiarly agreeable in feel, was exhibited in very pleasing shawls made by English and California manufacturers. But the most interesting of the new fabrics were the cloths made of camel's down, which have recently come into extensive use in Russia.

The Roumianstoff Cloth Manufactory of General Siloverstoff, situated in the Volga Province of Russia, exhibited beautiful plaids, blankets, and other tissues, adapted for the most luxurious consumption, manufactured from picked camel's hair and goat's down. These products find a ready sale in Paris. More interesting still was a stout and leather-like, though soft, cloth, without nap, made from a mixture of Merino, Russian, and Kirghese wool, with camel's down, called "half-merino." This is dyed a pale yellow tint, and finds an extensive sale among the Asiatic tribes under the name of *jeltiak*. These tribes, from time immemorial, have dressed in yellow cloth made exclusively of undyed camel's hair. The appearance of a dyed cloth in which the camel's hair was mixed with wool, acquiring greater strength, yet having the same color, has caused the Asiatics to substitute the jeltiak for the original camel's-hair fabric. This cloth has now great repute among the Caucasian Armenians, and the Persians living on the coasts of the Caspian Sea. The success of this manufacture is in a measure due to the invention of a particular apparatus by means of which the soft and downy parts are separated from the fleeces of coarse Siberian and Kirghese sheep and goats, the down of the Siberian goat producing stuffs remarkable for their softness and lightness.

The celebrated Montagnac coatings, first made in France about twenty years ago by processes patented by the inventor whose name they bear, had beautiful illustrations at the Exhibition, from Sedan. They are sometimes called cloth-velvets. The pile of the surface is usually furnished by fibres of cashmere wool, incorporated in the yarns of the fabric, and they are straight and perpendicular to the surface, the cloth having the aspect of a silk-velvet, but with a softness

peculiar to the cashmere fibre. The pile is developed on the surface by *battage*, or beating the moistened cloth with elastic rods.

Formerly, only the long hair of the cashmere goat and camel were used, besides wool, for making pile fabrics. In 1850, Mr. Benjamin Crosland, of Huddersfield, England, invented or rediscovered a process by which the short hairs of the cow and calf could be used in the manufacture of imitation seal-skins. The mean feature of his process consisted in boiling the fabrics for a long time in water, which develops the lustre of the fibre. These fabrics were for a long time imported into the United States under the pretence that they contained no wool, being thus subjected to a less duty. A rigorous microscopic examination by the National Academy of Sciences, made quite recently, under the direction of the Secretary of the Treasury, seems to have established the fact that the short hairs of the cow and calf are spun with at least enough wool to carry the fibre,—a successful spinning seeming otherwise impracticable. The cow-hair seal-skins, which are an important specialty in England, were illustrated by beautiful specimens at the Exhibition.

Another animal product, which is not strictly a textile fibre, because it cannot be spun like those above referred to, must be considered in this connection,—that is, horse-hair, the material of the fabric ordinarily known as "haircloth." This material, as a covering for furniture, a century ago was held in high consideration. The wife of Benjamin Franklin, describing the furniture of her mansion in Philadelphia, says it was covered with black haircloth, "as handsome as *padisoy*" (Padua silk). Modern fashion has driven this material from fashionable drawing-rooms, but its durability still causes it to be retained in unambitious apartments. There were two conspicuous exhibits of this material. Ranking first in elegance was an exhibit made by Edward Webb & Son, Worcester, England. These haircloths were woven in stripes of rich blues, scarlets, and crimsons, with whites, and in simple but rich colors, brocaded and figured. They possessed all the elegance which could be given to this material, and for certain purposes, as for summer apartments and houses in tropical regions, possess adaptations found in no other upholstery materials.

The Pawtucket Haircloth Company, of Rhode Island, made an exhibit of this fabric, the peculiarity of which was that it is the result of the first successful weaving of haircloth by power, the hand-loom being, so far as known, used by all other manufacturers of this fabric at home or abroad. The success of the company referred to is due to their achievement of the work of picking up, and applying automatically, each individual hair which is to compose the texture of a

hair filling, interlaced by a warp of cotton thread. This is accomplished by a little machine which could be packed in a box two inches square. This machine, which is detachable for repairs, is attached to a loom, both the machine and loom being operated by power, and it forms the pivot upon which the whole manufacture turns. It is essential that the machine should pick up but one hair at a time. To accomplish this, the picker in the machine has a groove or slit invisible to the naked eye, so that the whole of this manufacture turns upon a point which can only be seen with a microscope. The loom is so adjusted that the movement of the web is arrested until the picker lifts up its hair. The end of the hair is seized by a rod, the end of which operates like a thumb and finger, and is carried transversely between the warps. This little apparatus is attached to four hundred distinct looms in the establishment of the company. One girl tends ten looms, and this one girl, by means of this machinery, does the work requiring twenty operatives on hand-looms. By means of these appliances, this single establishment, employing only 150 work-people, produces 600,000 yards of haircloth per annum, each loom weaving five yards per day. It consumes annually 450,000 pounds of horse-hair, equivalent to the tails of 600,000 horses. The large exhibit showed the unquestionable superiority of the machine-made goods to the ordinary hand-loom fabrics.

All the classes assigned to the Judges of this group, in the department of wool, have now been considered, except that of wool machinery. While all the varieties of wool fabrics were well illustrated, the wool machinery exhibited but very few of the modern appliances by which the fabrics are made. The fullest description of the machines exhibited would give but a faint idea of the improved machines now in use. To describe even those exhibited would require space and means not at our disposal, and would be unsuited to the popular object of these reports.

SILK AND SILK FABRICS.

BY JOHN L. HAYES.

Silk with its fabrics, by the value of the raw material, corresponding to an equal weight of silver, its tenacity equal to that of iron, and its lustre surpassed only by that of the precious metals and stones; by the splendor of its fabrics, their relations to the decorative arts, their influence upon painting, heraldry, and the ceremonies of the church, their place as a means of exchange in early commerce, and the correspondence of their production in Western Europe with the decline of Oriental power,—would seem to claim a more extended notice than we have given to the homelier fibre and fabrics which have thus far occupied our attention. But the popular interest attaching to silk and its fabrics has made knowledge of the subject so general that we could hope to add little to the common stock of information as to the sources of this fibre or the history of its Oriental and European fabrication. Besides, we do not forget that the principal source of the popular knowledge of this subject in this country is the exhaustive report prepared by Mr. Cowdin, the Chairman of this group, in his former official position as an American Commissioner at the Paris Exposition of 1867, and that it would be vain to expect to glean from a field which had been so thoroughly reaped and harvested.

The writer will confine himself, in this portion of his report, to a brief sketch of the more general impressions made by the foreign exhibits of fabrics of silk,—omitting notices of the raw material, and not attempting any analysis or minute comparison of foreign fabrics, —and to a notice, more extended, of American products.

Before proceeding with these sketches, it is but an act of duty for the writer to refer, as he can without indelicacy, to the character of the work performed by the subdivision of the Judges of Group IX. intrusted with the examination of silk. They consisted of Mr. Gustav Gebhard, a practical manufacturer of Elberfeld, Germany, one of the most celebrated and extensive fabricants in Europe, whose facility for work in this department was aided by his rare command of all the Continental languages; Mr. Louis Chatel, an eminent manufacturer of Lyons, who, confined to his chamber by an unfortunate accident, still insisted upon having samples of all the fabrics under examination submitted to him in his chamber; Mr. Hayami Kenzo, an accomplished Japanese gentleman, the Government Director of silk-reeling establishments in his own country; Mr. August Behmer, an Egyptian

gentleman, familiar with the production of raw silk; Mr. John G. Neeser, a Swiss gentleman; and Messrs. Cowdin and Le Boutillier, Americans,—the latter three of very large experience in the silk trade. All the exhibits were carefully inspected in the cases by the Judges of the subdivision, and submitted to subsequent examination and tests through samples. The sewing-silks and twists exhibited were submitted to rigorous tests by machines and otherwise, to determine their smoothness and tenacity; careful notes being taken of these experiments. Brief as the awards are in this subdivision, their value is greatly enhanced by the high character of the Judges and their conscientious and rigorous examination. To American exhibitors in this department, especially, will the high awards they have received from foreign manufacturers, from whom even mention is praise, be of peculiar value. The writer, instructed, as he could not fail to be, by daily intercourse with his accomplished associates, and guided in his observations by their direction, has less diffidence in offering the notes which follow.

FRANCE.

France, as occupying the first position among the silk-manufacturing nations, having had a production in 1874 of $116,000,000, and an export of $95,000,000,—a production three times as great as Germany, which next follows her,—commands the first notice. The principal French display of silks, being in a somewhat secluded court, was made more pleasing from the exclusion of other objects, and the brilliancy of the fabrics was enhanced by the extreme simplicity of the cases inclosing them. No section of the Exhibition was more attractive than this court, displaying as it did the models of perfection in the most luxurious department of the textile industry, and the most brilliant and artistic products which the weaver's art can create. In this court were gathered the substantial proofs of that aspiration for ideal excellence in the material, fabrication, and artistic form of her products, which has given to France the crown of industrial glory. With all the pleasure conveyed to the eye and senses by graceful designs and infinitely varied colors, by gorgeous decoration and unexpected combinations of material or color, perhaps the chief satisfaction derived from the inspection of the products of this court resulted from the consciousness that they were the best results hitherto attainable by human effort in one great department of industry. Another vivid impression made by this court was that the industry it displayed was the product of an æsthetic culture, general and special, without example in the world, and of influences such as have existed in no other nation. The industry was planted by the royal foresight of

King Henry of Navarre, and sustained by the political economy of Colbert. It grew up in the genial atmosphere of the most splendid courts of Europe. The chemistry of Berthollet and Dumas furnished dyes for its fabrics; the traditions of the Renaissance and the pencil of Watteau gave it designs; and Chevreuil imparted to it the secrets of harmonizing and contrasting colors. While, in later periods, the protective influences of the Government (whether empire or republic) have never been wanting, the pre-eminence of the silk-manufacture of France has been sustained by a working population who have inherited the traditions and secrets of manipulation from generations of artisans, and by art schools for workmen, which Lyons was the first city in the world to inaugurate.

The visitors at the Exhibition, whose imagination had been excited by the learned researches of Michel upon the precious stuffs of the Middle Ages, or the splendidly-colored plates of the characteristic silken tissues of every period recently published in Paris, might have experienced some disappointment at the comparatively small display of the figured brocades, damasks, and velvets so conspicuous in the personal costumes of the earlier periods. Mainly, as is asserted, through the influence of the Franco-Prussian war, which plunged France into mourning, the figured and brocaded stuffs were replaced by plain fabrics in personal costumes, although now beginning to reappear. It may not be generally known that it is in the perfect fabrication of the plain stuffs, especially the plain black silks, that the highest art of the manufacturer consists, as no inequality of thread or unevenness of tissue or dye can be concealed by the figure. Of the plain tissues of this description in this section recognized by the expert Judges as of incomparable excellence, it is useless to attempt a description. To be appreciated, they must be seen or worn.

There was no lack of fabrics whose beauty was due to design and color. Conspicuous among them were printed foulards, upon which the arts of design and of impression would seem to have been exhausted. The miraculous power of the Jacquard loom to produce the most complicated designs was most tastefully and appropriately shown in a woven representation in silk, upon a background of tissue, about two feet long and as many broad, of the mulberry in leaves and fruit, with the silk-worm and moth in every stage of development; the colors exquisitely shaded, the mulberry branch being intertwined with a ribbon bearing the significant motto, *vestit, ornat, ditat.*

Although decoration is sparsely used in stuffs for dresses, it still finds an infinite field for application in stuffs for upholstery, and especially in fabrics for church vestments. Antiquarian learning seems

to have exhausted itself in seeking examples and authorities in the past for forms and colors of ecclesiastical vestments. Silk, gold, silver, and jewels glitter on the copes, the chasubles, the mitres, the stoles, and altar-cloths, of the church more prodigally, and combined with higher skill, than they could have done in the most splendid period of mediæval history. It is said that in some of these tissues the workman can weave not more than an inch in a day, and the prices sometimes attain the enormous sum of three hundred dollars per yard. The most brilliant display of these fabrics, as well as those for upholstery purposes, was made by Messrs. Tasiman & Chatel; the latter being a Judge, the exhibit was precluded from an official award. Their magnificence equaled all that the imagination could conceive. An interesting feature of some of these fabrics was a reproduction of Oriental types, illustrating the views maintained by the learned M. Michel, that the figures on heraldic coats of arms were derived from silk-stuffs of the East, of which the representation of animals—such as lions, leopards, eagles, griffins, etc.—formed the ordinary ornament. On one of the fabrics exhibited by Mr. Chatel, with a background of gold and red, was interwoven, so as to cover the surface, repeated figures of elephants, horses, falcons, cocks, dogs, deer, and mounted horsemen; all designed conventionally, or in heraldic style.

To illustrate the extent and variety of the silk products and producers of France, as well as to pay a deserved tribute to the typical silk-manufacturers of the world, we subjoin a list of the principal French exhibitors, with the products:

Black silks	C. J. Bonnet's Sons & Co., Lyons.
Black silks	Jaubert, Audras, & Co., Lyons.
Black silks	Tapissier Son & Debry, Lyons.
Black silks	Gourd, Croisat Son, & Dabost, Lyons.
Black silks	Antoine Guinet & Co., Lyons.
Black and colored velvets	Gautier, Bellon, & Co., Lyons.
Black velvets and colored silks	J. P. Million & Servier, Lyons.
Black velvets	Font, Chambeyron, & Benoit, Lyons.
Black silk velvets	C. J. Servant & Co., Lyons.
Black dyed silks	Gillet & Son, Lyons.
Dress silks and novelties	Poncet, Senior & Junior, Lyons.
Colored silk goods	Faye & Thévenin, Lyons.
Silk goods	Sevène, Barral, & Co., Lyons.
Damask silks and novelties	Bresson-Agnès & Co., Lyons.
Colored failles and gros-grains	Bardon & Ritton, Lyons.
Striped and fancy silks	Mauvernay & Co., Lyons.
Siciliennes	Audibert, Monin, & Co., Lyons.
Poplins	J. Drogue & A. Monnord, Lyons.
Foulards	A. L. Trapadoux & Co., Lyons.
Foulards	Jandin & Duval, Lyons.

Foulards	Gondard, Cirlot, & Martel, Lyons.
Hatters' plushes	Huber & Co., Paris.
Black and colored satins	Brosset-Heckel & Co., Lyons.
Hatters' plushes	J. B. Martin, Tarare.
Crapes	Montessuy & Chomer, Lyons.
Umbrella silks	Alex. Giraud & Co., Lyons.
Velvet ribbons	F. Brioude, St. Etienne.
Velvet ribbons	Giron Brothers, St. Etienne.
Sewing-silks	Benoit, Tabard, & Co., Lyons.
Silk gauzes and bolting-cloth	L. Dornon, Lyons.
Bolting cloth	L. R. Gascou, Montauban.
Raw and sewing-silk	Joseph Puydebart, Lyons.

GERMANY.

Germany, although ranking second in the production of manufactured silk,—having had a production of the value of $38,000,000 in 1874,—was represented by few exhibitors, awards having been made but to four exhibitors; viz., to Escales & Hatry, of Saargemünd, for silk plushes for hatters' use, of remarkable perfection in color and finish; to Gressard & Co., of Hilden, for foulards of high excellence; to Carl Mez & Sons, of Freiburg, Baden, for sewing-silks of great beauty in color and finish; Massing Brothers & Co., Püttlingen, for hatters' plushes of high excellence.

But the paucity of exhibitors from Germany was atoned for by the beauty of exhibits made by Mr. Gustav Gebhard, of Elberfeld, who, on account of his position as Judge, was precluded from an award. In the absence of the notes promised by Mr. Gebhard, we are compelled to trust only to our own memoranda and impressions. The products of the establishment represented are understood to be furnished by the labor of some four thousand persons, not employed (as with us) in a single establishment, but working hand-looms in their own houses. The goods, exhibited in two very large cases, and most tastefully arranged, consisted of figured velvets, satins, and brocades, many of them executed in silver and gold. A striking feature of the exhibit was the designation by cards of the markets for which the several fabrics were specially destined. India, Siam, Batavia, Constantinople, had each their special fabrics, in which the characteristic features of the native productions of different Oriental countries were reproduced, doubtless with cheaper materials, but with attractive effects.

INDIA.

The reference to copies of Oriental fabrics leads us naturally to the original fabrics of silk which were exhibited from the East. The India Museum's most attractive and instructive exhibit contained

beautiful specimens of India silks. Conspicuous among them was a brocade long scarf, or *Kincob*, from Benares, in which, from silver leaves placed on a dark or deep-red ground, spring gold flowers with black centres. Another brocade, of wonderful beauty and exquisite texture, is composed of a gold ground, varied or shaded by delicate shades of silk, in low tones of blue and red. The figures in these brocades are all conventionalized. Still another attractive fabric was a fine silk gauze, embroidered with gold in flattened or hammered scales.

More instructive to the student of textiles than the few large and brilliant samples of fabrics was the collection, made under the direction of the East India Museum, of the splendid volumes, albums, and framed samples of all the textile fabrics of India, in which the wonderful variety and perfection of the native silk fabrics of India are admirably displayed. The expense of a series of these samples (about two thousand dollars) forbids their possession by individuals; but none of our industrial or art museums should fail to have these admirable models of industrial art-work.

NETHERLANDS COLONIES.

Among the silk fabrics shown at the Exhibition, there was nothing surpassing the scarf-like brocades from Sumatra and Java, exhibited in the collection of the Netherlands colonies. They belong to the native princes, and were lent for the purpose of exhibition in Philadelphia. They were all of native production. A model of a rude loom was exhibited, upon which they are said to have been woven. But it seems inconceivable that such fabrics could have been produced by such rude mechanism. The ends of the scarfs are fringed with flat tassels of silver, rudely made and unpolished. The fabric is of silk of a dull red tone, shot with gold thread. The terminal borders are well marked and broad. The designs are arabesques of a geometrical construction,—no figures of flowers or animals being introduced,—but of a most subtle and ingenious character. Although the texture is nearly covered with gold, it is scarcely apparent; and the general tone of the fabric is low and subdued. This subdued effect is produced by the neutral tone of the silk, and the manner in which the design is made to spread all over the texture.

CHINA AND JAPAN.

Japan and China, although leading all other nations in the supply of raw material, and in silken embroideries unequaled, were inferior in the artistic character of their woven goods to India and Java. The plain colored satins of China were of excellent manufacture; and

a fine exhibit consisted of colored and figured silks, which were declared by the Judges to be marked improvements over former productions of that country. Among the exhibits from Japan, the most conspicuous for excellence were the silk crapes, white, dyed, and printed; the dyed cherries and scarlets being notable for the perfection and brilliancy of their hues, while others were most skillfully shaded. Productions of silk from cocoons of worms feeding on the walnut, and others from worms feeding on the oak, were interesting. The most curious of the Japanese fabrics were brocades of great apparent richness, on account of the gold woven in the tissue; gold flowers and leaves being intermingled with scarlet flowers upon an indigo-blue ground. The threads of gold forming the warp, upon close examination were found to consist of exceedingly narrow or thread-like strips of paper, gilded, but only on one side; the gilded side being invariably brought to the surface in the tissue. It was observed by experts that this effect could only be produced in hand-looms.

TURKEY, EGYPT, TUNIS.

The less remote Oriental nations—Turkey, Tunis, and Egypt—showed that they had not lost the arts of silk fabrication which they once enjoyed in supreme perfection. The damasks and brocades, woven in silk alone, or mixed with gold and silver, though Oriental and characteristic in design, in many cases exhibited excellent taste and workmanship.

RUSSIA.

Russia, combining Oriental sentiment and traditions with the art and technical skill of Western Europe, made exhibits of silk fabrics which worthily attracted universal admiration. We refer particularly to the damasks and brocades of silk, gold, and silver, the latter literally "cloths of gold and silver," made in Moscow and St. Petersburg, and the sacerdotal vestments in gold and silver tissues made in the same cities. These tissues, vying with the best productions of Lyons in execution, have a characteristic interest and beauty, derived from the traditional splendors of the Greek Church. Some of the rich fabrics were especially noticeable from the pure Byzantine character of the design, employing religious symbols, which Ruskin has pointed out, in his *Stones of Venice*, as characteristic of the earliest Christian or Byzantine decoration. The notable exhibitors of these magnificent stuffs were A. & W. Sapojinkoff, Moscow; John Sytof, St. Petersburg; Mosjookhin & Sons, Moscow; and F. A. Jevargeif, St. Petersburg.

The ordinary silk fabrics exhibited by Russia were of high excellence. Among those deserving special mention are Sergius Zoobkof, of Khomootovo, Moscow, for rich colored failles; Alexis Fomitchef, Moscow, for rich figured failles and silk cashmeres; Kondrashef Brothers, Grebenevo, Moscow, for plain black and colored failles and upholstery damasks; Emilianoff & Rochefort, and Zolotaref & Ribakoff, Moscow, for silk and wool dress goods; Shelaief Brothers, Moscow, for black and colored satins.

Mr. A. Néboltine, a Russian statistician, says, "We commenced in the last century to manufacture silk in Russia; but it is only during the present century, and above all since 1830, under the influence of a protective tariff, that this fabrication has become developed, or acquired any considerable importance." He shows that in 1872 there were 460 silk-factories, 15,800 workmen, and an annual production of 10,300,000 roubles, including the production of trans-Caucasia, which is more of a domestic than manufacturing character; and that the importation of foreign silks in 1871 was of a value of 6,293,935 roubles, or a little more than half that of the national fabrication.

SWITZERLAND.

Returning to the more prosaic regions of the European silk-manufacture, we find that Switzerland best represents the fabrication adapted to the ordinary commercial demands of modern times. Zurich, the chief centre of the fabrication, occupies the same position in the silk-manufacture that Bradford does in the worsted and Verviers in woolen industry. She manufactures for export and for the million. Economy of production is the first object. Although provided with very cheap labor, Switzerland has led other nations in the application of labor-saving machinery, and she has chiefly furnished the models for the best machinery used in this country, both in the manipulation and dyeing of silk. She excels in the combination of cheaper materials, such as cotton with silk; the silk being thrown upon the surface, and the cotton forming the back, as in cotton-backed satins and marcelines. Although producing the higher classes of dress silks, black and colored, in great perfection, as evinced in the beautiful exhibit of Baumann, Aelter, & Co., of Zurich, the characteristic of the Swiss manufacture is the adaptation, for popular consumption, of fabrics which are made attractive by taste in design, excellence in execution, and reasonableness of price. An interesting evidence of the confidence of the Swiss manufacturers in holding their own ground against foreign rivals is the circumstance that the Swiss Commissioner, alone among foreign representatives, caused a series of albums,

most beautifully arranged, containing samples of all the silk-products exhibited by his country, to be presented to the principal industrial museums and associations of this country. One of these albums the writer has now before him. In this album there are no rich brocades, damasks, or velvets, and nothing conspicuous in an artistic point of view. The fine gros-grains and failles, black and colored, exhibit great regularity and perfection of execution. The figured silks are marked for the simplicity and delicacy of their designs; the fine stripes, so difficult of execution, being perfect. The few brocades are tasteful, but not showy. The marcelines and the satins, with either cotton-tram or chain, are very effective, especially in the materials for cravats. We must not omit a product in which silk, ordinarily ministering only to luxury, contributes to the first of necessities. It forms the material for bolting-cloth used in the manufacture of wheat flour. In the manufacture of this fabric the Swiss have attained the utmost perfection. The leading exhibitors, with their products, were:

Black and colored failles and taffetas	Adlischweil Silk Goods Factory, Adlischweil, near Zurich.
Black and colored gros-grains and failles	Beaumann, Aelter, & Co., Zurich.
Black and colored failles	S. Rutschi & Co., Zurich.
Marcelines	Ryffel & Co., Staefa and Zurich.
Colored and figured dress-silks	Emil Schaerer & Co., Zurich.
Colored failles and changeables	J. Schwarzenbach-Landis, Thalweil, near Zurich.
Plain, striped, and check dress-silks	Joh. Stapfer's Sons, Horgen, Zurich.
Cotton-back satins	Stunzi & Sons, Horgen, Zurich.
Dress-silks	Baumann & Streuli, Horgen, Zurich.
Low-priced cravat materials	Jansen, Bodek, & Hertz, Reisbach.
Black and colored gros-grains and brocades	William Schroeder & Co., Zurich.
Silk bolting-cloths	Meyer Brothers, Zurich.
Silk bolting-cloths	Heidegger, Wegmann, & Co., Seefeld, Zurich.
Silk bolting-cloths	Ruff Huber, Zurich.
Silk bolting-cloths	Egli & Sennhauser, Zurich.
Silk bolting-cloths	Homberger Brothers, Wetzikon.

AUSTRIA.

Austria, which more properly should have been considered in connection with Germany, exhibited black silks well adapted from their low price to a large consumption, cotton-back velvets, and silk velvets, black, colored, and white, of excellent manufacture. The prominent exhibitors were:

Black silks	S. Trebitsch & Son, Vienna.
Cotton-back velvets	Carl Hetzer & Sons, Vienna.

Fancy silks	C. G. Hornbostel & Co., Vienna.
All-silk velvets	F. Reichert's Sons, Vienna.
Hatters' ribbons	J. Swartz & Son, Vienna.

GREAT BRITAIN.

Great Britain failed to make any adequate representation of her manufacture, although it counts by millions of pounds sterling in value. There were only four well-marked exhibits. Pin Brothers & Co. did high credit to Ireland, by a splendid display of their black and colored hand-woven plain silk poplins, which are celebrated throughout the world, and by furniture damasks of fine effect. Norris & Co. made an excellent display of upholstery silks, which were specially noticeable for admirably executed designs, in great variety, all conceived in the spirit of the modern English school. Admirably executed figured and emblematical ribbons were exhibited by Thomas Stevens, of Coventry, as well as an excellent silk loom of quite original construction. There were two excellent exhibits of sewing-silks.

ITALY.

Italy, who, in the fourteenth and fifteenth centuries, supplied all Europe with the richest fabrics of silk, equally disappointed the visitor at the Exhibition by her display of fabrics in this department; only a single exhibit of figured velvets from Milan being noticeable. A series of rich antique stuffs in the Castellani collection, however, gave the visitor some conception of the ancient splendors of the silk fabrication of Italy.

SPAIN.

The political condition of Spain prevented her from making the display of which she would have been otherwise capable. Spain is still a treasure-house of the splendid stuffs of the past, most of the richest ornaments of the Kensington Museum having been obtained in that country. We are assured that many of the traditionary arts of silk-weaving have been preserved, particularly in the religious houses. Black silks of good manufacture, and black cashmere silks in fine grades, well made in every respect, were exhibited; also curtains, furniture damasks, and brocades in good colors; effective stuffs for cravats and fichus, and hand-made figured silks in old Moorish and Oriental styles. The principal exhibitors and products were:

Black silks	Antonio Pascual & Co., Reus, Tarragona.
Black cashmere silks	Farriols & Son, Barcelona.
Curtain and furniture damasks	Benito Malrehy, Barcelona.
Silk cravats and fichus	Eduardo Reig & Co., Barcelona.
Valencia silks in old Moorish styles	Fernando Ibanez Palenciano, Valencia.

PORTUGAL.

Portugal surprised us by the excellence of several exhibits of gold and silver damasks for church purposes, and of rich brocades and brocatelles for furniture and curtains, as well as well-made dress silks; all evincing an unexpected progress in that country towards industrial independence. The leading exhibits were as follows:

Gold and silver damasks	David José da Silva & Son, Oporto.
Gold and silver cloths	Viuva Ferreira Campos & Co., Oporto.
Upholstery stuffs	National Silk-Weaving and Spinning Co., Lisbon.
Gold and silver galloons and gimp	Custodio Lopez da Silva Guimaraes, Penafiel.
Black and colored failles and brocatelles	Ramires & Ramires, Lisbon.

In observing, as we do in this slight sketch, the high attainments made in silk fabrication by countries regarded as barbaric, as well as those possessing all the modern inventions, we perceive that there are no conditions in any country, where civilization has dawned, preventing the appropriation of this industry. The raw material, unlike wool and cotton, from its high intrinsic value, compared with its weight, being almost as transportable as the precious metals, is almost equally available to every country. Where traditionary skill, which still nourishes the manufacture in the declining countries of the East, is wanting, or favorable circumstances, like the exodus of silk workmen into England from the revocation of the Edict of Nantes, do not exist, the encouragement of governments and the enterprise of the people must give the impetus to a manufacture which every self-dependent nation aspires to plant upon its soil. What these influences have accomplished we shall now attempt to trace in the history of the silk fabrication in our own country.

SILK-CULTURE AND FABRICATION IN THE UNITED STATES.

The exhibits of American silks at Philadelphia were, without question, the most triumphant trophies of achievements in the textile industry within the last two decades displayed by any nation or department of textile fabrication. The brief period within which our silk-manufacture has reached its high position tempts us to describe the steps of its progress. But a detailed history would be unsuited to the general plan of this report, while any attempt at original historical research in this department is rendered unnecessary by the full "particulars in relation to silk and the silk-manufactures, chronologically arranged, prepared by Mr. Franklin Allen, Secretary of the Silk

Association of America," published in the *United States Industrial Directory of 1876;* and by the exceedingly well-written and carefully-executed *History of the Silk-Industry of America, prepared for the Centennial Exposition by L. P. Brockett, M.D.*, and published under the auspices of the Silk Association of America. These works will be freely drawn upon without further acknowledgment. The writer will add that he has verified the observations of Mr. Allen and Dr. Brockett, as well as his own impressions and notes at the Exhibition, by a recent personal visit to most of the representative silk-manufacturing establishments in this country.

THE SILK-CULTURE.—We will first notice the growth and extension of the silk-culture in this country. The production of the raw material was attempted in the earliest periods of our colonial history, in the Southern colonies, where the conditions of climate were most favorable for the growth of the mulberry and the raising of silk-worms; but the more profitable culture of tobacco and rice, and subsequently of cotton, together with the incapacity of the only working population of the South, the negroes, to perform the delicate operation of reeling, caused the silk-culture, in that section, finally to wholly disappear. It was more successful in Connecticut, where the conditions of climate were less favorable, but where the necessities of the people, and their habits of thrift, had developed an active household industry.

Through the influence of Dr. Stiles, afterwards President of Yale College, a State bounty was given, in 1763, for the culture of the mulberry and the production of raw silk. In 1766, half an ounce of mulberry-seed was sent to every parish in the State. The domestic culture of silk was very general in the State during and subsequent to the Revolution. It became a fixed industry, however, only in the town of Mansfield, where it had been introduced by Dr. Aspinwall, in 1766. This town became noted for the production of silk grown and reeled in the households. "Mulberry orchards," of the hardy native white mulberry, were distributed throughout the township, and rows of this tree shaded the highways and fringed the cultivated fields. The production of silk in a single family sometimes amounted to one hundred and thirty pounds in a season, and most of the labor was performed by women and children. The silk, very imperfectly reeled, was spun on a hand-wheel into a roughly-made sewing-silk (dyed in the household), which was usually sold in barter to the country stores. The floss, waste, and pierced cocoons, being mixed with wool, cotton, or flax, were made into coarse stuffs for every-day wear. The domestic production of this town from 1820 to 1831 was of an annual value of not less than $50,000. In this domestic manu-

facture, as we shall hereafter see, were the germs of the present silk-industry of America.

From 1780 to 1820 the domestic culture and fabrication of silk was also pursued to some extent in New Jersey, Pennsylvania, and parts of New York, Delaware, Maryland, and Virginia, but without any results bearing upon the extension of the manufacture, as in Connecticut.

About the period of 1825, with the growing sentiment which then prevailed for the extension of American industry, the public attention was attracted by means of congressional reports, messages of State governors, and publications by enthusiasts in the press, to the field for American industry which lay open in the silk-culture and fabrication. Among the individuals most prominent as writers and practical experimentists, though with no results profitable to themselves, were Mr. Duponceau, of Philadelphia, and Judge Cobb, of Dedham, Massachusetts. Their appeals found a response in the public mind, dictated by the natural desire to appropriate the most attractive and luxurious of the textile arts, together with a new product for our soil. But the means by which the much-desired industry should be planted were not yet made clear. At an unhappy moment, Dr. Felix Pascalis made known to the public the remarkably rapid growth and supposed excellent qualities of the *Morus multicaulis*, first planted in the United States in 1826. In place of the old method of planting the well-known and hardy, but slow-growing, mulberry-trees, it was proposed to secure leaves fit for feeding from trees of a single season's growth, which seemed possible through the extraordinary luxuriance of growth of the multicaulis variety. The public were taught that every farm should be a nursery for the young trees, that every house should have its cocooneries, and that silk would become as cheap as cotton. At first gradually, and then more and more rapidly, the excitement in regard to the multicaulis grew, until it reached a speculation, whose extent and folly, and the ruin it brought in its collapse, in 1839, are too well remembered to need any further notice. With the subsidence of the multicaulis fever, there came a general decline of interest in the silk-culture, except in Mansfield, which had so thoroughly tested the value of the white mulberry as to partake but little of the prevalent excitement. There, however, the mania for speculation, which seems to have been an epidemic of the times, was transferred to the white mulberry. The fever had its course and its reaction. Silk-culture sank into disfavor in the town to which it had given prosperity for nearly seventy years. Finally, in 1844, a blight of a general character, to which even the hardy

white mulberry yielded, gave the finishing blow, and silk-culture in America ceased to exist.

But the silk-culture, humble as it was and brief in duration, was the means of developing a knowledge of the fibre, of its uses, and manipulations; it drew attention to the possibilities of the fabrication, and created a passion for working it. The silk-culture was the humble larva from which was developed the winged and perfect insect, brilliant with gold and color, to which the perfected silk-manufacture may not unaptly be compared.

FABRICATION OF MACHINE- AND SEWING-SILK.—Proceeding to a history of the organized manufacture of silk in this country, we find that two of the most important branches of the manufacture, that of sewing-silk and spun silk, were direct offshoots from the domestic silk-culture of Connecticut. Attempts were made at Mansfield in 1810, 1814, and 1821, by Rodney Hanks, to manufacture sewing-silk by power, but without success. His grandsons are now successful manufacturers. In 1829 a company, consisting of seven individuals, most of whom subsequently became identified with numerous enterprises in the silk-manufacture, was incorporated under the name of the Mansfield Silk Company. Their first successful machinery was made by Mr. Lilly, the promoter of the enterprise, in accordance with the descriptions and rude drawings of Edmund Golding, a young English "throwster," who came to this country at the age of seventeen, expecting to find employment in his art. But the machinery proving inadequate for the manufacture of American silk, as it was then reeled, raw silk for the first time was imported from England and used in the manufacture of sewing-silk, which proved superior to the hand-made skeins. From that first successful attempt, the manufacture of sewing-silk, by power, has been uninterruptedly continued, though with successive improvements in machinery, as well as in the quality of the goods made. This company, having unwisely entered into the culture of silk, was finally dissolved. Several members of the disbanded company started the manufacture of sewing-silks in other places, and contributed to the spread of the new industry. An ingenious mechanic of Mansfield, named Rixford, made improvements in the machinery for winding, doubling, and reeling, which were adopted in a mill started at Florence, near Northampton, out of which the now celebrated Nonotuck Company's establishment sprung. So that in the humble domestic silk-culture of Mansfield may be clearly seen the source of the present manufacture of sewing-silks and machine-twists in this country, amounting in 1875 to over six million dollars in value.

This is, at present, the characteristic department of New England

in the silk-manufacture, and the few details which we are able to offer in relation to this branch of silk fabrication can be most appropriately given in this connection. So numerous have the establishments become (twenty-five in Connecticut and Massachusetts, besides those in other States), and necessarily so active is the rivalry between them, that it would be invidious to specialize the several contributions which they have made to the high advancement of this great branch of the silk-manufacture.

The first object sought by the early sewing-silk manufacturers was to rival and replace in our markets the Italian sewing-silks in universal use; and the sewings, at first, were put in packages with Italianized labels, simulating Italian sewings. Although dealers had the usual distrust in American productions, our early manufacturers were aided by the long voyages between this country and Europe, which often caused temporary deficiencies in the supply of Italian sewing-silks. By filling up these gaps, our manufacturers got their first hold upon the American markets. At first, only colored silks were attempted; competition with the superior black sewings of Italy being considered hopeless. Advancing in the fabrication, and attaining a permanent black dye, through its introduction in 1838 by Messrs. Valentine & Leigh, who had been practical dyers in England,—one of whom, Mr. Leigh, still survives,—they undertook a fabric in greater demand,—black sewing-silks in skeins, for tailors' use. The sewing by the hand, and the simple needle then in sole use, demanded a far less perfect thread than that now required for machine-sewing. Illustrations of the solidarity of the industries are perpetually recurring. The American invention of the sewing-machine was the inauguration of the sewing-silk manufacture of America, in the forms and proportions which it now holds. The sewing-machine required that silk for its use should be put upon spools, and be of a special manufacture. The proprietors of an establishment in Massachusetts, now famous, knowing the difficulties attending the use of silk threads, as then made, upon the newly-invented sewing-machine, devised the plan of twisting the silk in a direction opposite to that of common or skein sewing-silk. Winding a pound of three-cord silk, thus twisted, upon spools containing one-half ounce each, they submitted it, in 1852, to Mr. Singer, who was then experimenting upon his newly-invented sewing-machine, with which he met difficulties that he could not overcome. We cannot so well describe this important step in the manufacture of sewing-silks as in the language of Mr. Lilly, a proprietor in the establishment referred to. The silk was handed to "Mr. Singer with the request that he would try it. He put a spool upon his machine,

threaded up, and commenced sewing. After sewing sufficiently to enable him to judge of its merit, he stopped, and, after examining the work it had done, exclaimed, 'Can you make any more like this?' (addressing the agent, who stood watching the result with great interest:) 'I shall want all you can make,'—a prophecy literally fulfilled. The new fabric assumed the name of 'machine-twist;' and from that time to the present the amount of silk consumed upon sewing-machines is marvelous. A new enterprise was born, which created an industry giving labor to many thousands."

Although, in this first experiment of machine-twist, the invention was complete, the manufacturers still found great trouble in its production; for the machine required a thread which, to be moved automatically, must be absolutely perfect, like the machine itself. It was by gradual improvements in machinery, and manipulations generally too minute to warrant description, that they succeeded in the result they have now so completely attained,—that of placing upon spools a definite weight of silk thread, of continuous length, entirely free from slugs, knots, and uneven places, and perfectly adapted to the machine which is to apply it. We may, however, mention as American inventions, which have contributed to the advancement of this manufacture, new mechanical patented devices for spooling the thread and weighing it; and especially a machine in general use for stretching the thread after it has been twisted, which has the effect of lengthening the thread about fifteen per cent., and of making it even throughout. As the manufacture advanced, the standard of excellence, both on the part of the producer and consumer, grew higher. In the earlier stages of manufacture, the black silks were heavily weighted by chemical means; greatly diminishing the tensile strength of the thread,—a system then invariably pursued by the makers of foreign sewing-silks. Certain American manufacturers then introduced goods of strictly pure dye; and, to insure the consumer against fraud, also introduced measuring and strength-testing machines, by means of which the buyer might inform himself of the actual value he had in each pound of twist. In time, the makers placed upon the goods their own names and brands or trade-marks, like the well-known designations, "Nonotuck," "Corticelli," "Lion," "Eureka," etc., which are absolute guarantees, to the consumer and dealer, of the quantity and quality of the goods sold. The direct tests to which the American sewing- and machine-silks are subjected, in this country, by the ready-made clothing manufacture, unequaled by any other in the world in the extent and systematical character of its operations, has contributed greatly to the perfection of this branch of the silk-

manufacture. That the United States may now challenge the world in the fabrication of sewing-silks was fully demonstrated at the Exhibition, as here before said. All the sewing-silks exhibited were subjected to the most severe tests by the expert Judges. A result of these careful tests was the conclusion of the Judges, that certain American sewing-silks exhibited surpassed, in all the qualities which make up the sum of excellence, any displayed by foreign nations.

The statement of the aggregate production of sewing-silks and machine-twists in this country fails to show the large scale upon which this manufacture is conducted, and the activity of enterprise in this department. A better conception may be formed from the facts, that in a single establishment not less than six hundred operatives are constantly employed, and its consumption of raw reeled silk in the present year is one hundred and three thousand pounds of raw silk, of a value of about twelve dollars per pound. As an illustration of the rapidity with which this manufacture has been expanded, it may be stated that a firm of manufacturers who commenced the sale of sewing-silks in 1856, with a capital of twenty-five dollars, in 1876 consumed no less than three thousand pounds of raw material in their own manufacture, gave employment to one thousand hands, and sold a value of about eight hundred thousand dollars.

Before leaving this branch of the silk-manufacture, we must not omit to notice the machinery in actual operation at the Exhibition, illustrating the methods in use in this country for fabricating sewing-silk. A description furnished by an expert correspondent of the New York *Times* is better than any we can offer. The machinery in operation was exhibited by the Nonotuck Company, of Florence, Massachusetts, and the Danforth Manufacturing Company, Paterson, New Jersey. The writer from whom we quote says,—

"To begin with, the skeins of raw silk, just as they come from China or Italy, are strung upon winders, for the purpose of being wound on to bobbins. This is a very simple process, and done on very simple machinery; the only mechanical aid of any consequence being a reciprocating cam, which gives a lateral motion, and distributes the strand of silk equally over the bobbin. These bobbins are then transferred to the 'doubling' machine, on which any number of threads, from three up to ten, are wound together. But this machine involves one or two very pretty movements. As in the case of the winder, the equal distribution of the combined thread on the bobbin is regulated by a reciprocating cam; but a very neat attachment also stops any one bobbin the moment one of the threads, making the

combined thread, snaps. Immediately under the bobbin on which the threads are jointly wound there is an arm rising from a balance-frame. Should one of the threads snap, the guide, through which it runs, and which is only supported by its tension, falls back against the balance-frame. Its weight is sufficient to displace the frame and bring forward the arm; and the arm, having an elevation, raises the bobbin and unships it, at once stopping its revolution. By this ingenious arrangement, the main thread is kept of one continuous size without any trouble, because it cannot run on without the companionship of all the minor and component threads. On being taken from the doubling-machines, the bobbins are placed on the 'spinner,' which gives the various threads a sufficient spin to make a strand in the process of unwinding. The bobbins then go to the 'twisting' machine, on which the threads from three of them are firmly spun and twisted together to make what is called machine-twist silk, but from only two bobbins to make sewing-silk. Both kinds of silk are twisted twice, but with this great difference: machine-twist is first twisted to the right, and then to the left; while sewing-silk is first twisted to the left, and then to the right. The silk is then rewound into skeins, and, after being washed in strong soap-suds, is dried and stretched. The length of these skeins is regulated with great nicety by an ingenious adjustment. An eccentric drives a ratchet-wheel with a dog on it, and the adjustment causes the dog to strike the shipper and stop the winding-machine the moment the desired length of silk has been wound into the skein. The silk is now ready for the dyer, and, after being dyed, is again wound in bobbins preparatory to 'spooling.' The spooling-machine has a feed-shaft, with a right and left hand thread on it, and a half-nut on either side. This arrangement gives an easy and regular direct and reverse lateral motion to the guide, the spool remaining stationary; the length of silk wound on to the spool is regulated by a binder and a strap attached to a weight, both being governed by a treadle. The operator knows exactly how many times the guide should travel right and left to fill the spool. By pressing the treadle the weight below the shaft is raised, and releases the strap from the shaft; while at the same moment, and equally governed by the treadle, the binder (which is a small wheel) presses the belt against the shaft, causing it to revolve. The moment the spool is full, the operator ceases to press the treadle, the binder releases the belt, and the strap, attached to the weight below, falls on the shaft and stops it instantly. The same arrangement enables the operative to stop the revolution of the shaft in case of accident to the spool or thread, as the machine cannot run unless the foot is pressing on the treadle;

and, the moment the pressure ceases, the machine comes to an instantaneous stop. One of these spooling-machines will wind one hundred and ten dozen of spools a day; and some conception of the extent of the Nonotuck Company's business may be gained from the fact that they have no less than sixty of these spooling-machines in constant operation in their factory, where they employ over six hundred hands. Only one thing has to be done to render the spools ready for the silk; it is to stamp their two ends with the brand and the name of the company. This is done by one of the prettiest and most perfect little pieces of machinery in the hall, and the stamping of the colors into the wood obviates the falling off of printed labels, as is sometimes the case with cotton spools from insufficient gumming in the labeling-machine. The spools are fed from a trough, through a hollow post, into the stamping-machine; an arm pushing them one by one, as they come out at the base of the post, into a groove, where they are caught and held in position by a small weight, the spool at the same time pushing back a spring. Two spools are in the grooves at one time, the one receiving its first and the other its second stamping simultaneously. At either end of the spools are two dies, one inked with red and the other with blue ink. These dies press upon the spools simultaneously, impressing the name of the company in one color, and, on the second impression, the brand in the other color. The outer spool is then released by the momentary rising of the weight, and the spring against which it was pressing kicks it out into a basket. The groove-bed revolves, bringing the inner spool to the outside and a new spool into the place of the inner one; the operation being repeated *ad infinitum*. As the dies spring back from the spools, they take a quarter turn upward, which brings them under the inking-rollers; the rollers being inked and moving in a similar manner to those in a job-printing press. There are four composition rollers to each ink reservoir, and pair of dies. The whole stamping-machine is divided into two parts, each the counterpart of the other, and turns out the stamped spools at the rate of one hundred and twenty a minute. One machine will stamp seventy thousand to eighty thousand spools a day, sufficient to fill ten ordinary flour-barrels. When wound on the spools, the silk is ready for the completion of orders, or to go into stock in the warehouse."

The Fabrication of Spun Silk.—It was in the silk-culture that the largest and most celebrated of our manufactories of silk goods, that of the Cheney Brothers, had its birth. As this establishment is wholly without rivals in its special department, and one of the most characteristic in the whole range of the American textile industry,

it commands a special mention which would be invidious in other branches of the silk fabrication.

The sons, eight in number, of a farmer in South Manchester, after the custom of the town had cultivated mulberry-trees and raised silk-worms in their boyhood. Some remained at home, while others were scattered, but only to return. For four or five years previously to 1838, four of the brothers had been raising silk-worms and producing silk, like their neighbors. In that year they started a small silk-mill at South Manchester, for the purpose of making sewing-silk. Their increasing interest in the silk-culture, however, led them to suspend the operations of the mill for a time, when three of the brothers removed temporarily to Burlington, New Jersey, where they established nurseries and cocooneries, and published a magazine known as the *Silk-Grower's Manual.* Their energy having, however, been mainly devoted to planting nurseries of the multicaulis, and their plans having been frustrated by the explosion of that bubble, in 1839 they returned to their forsaken mill at South Manchester, and resumed the work of making sewing-silk from imported raw silk. Subsequently, they were rejoined by others of the family, who had established mulberry plantations in Florida and Ohio. We do not propose to follow the steps by which this establishment reached its present vast expansion. Success came slowly, and after many discouragements, and with it an enlargement of their operations. In 1854 a mill was built in Hartford. Buildings were added at South Manchester, new machinery and methods invented and imported, while new branches of manufacture were added to that of sewing-silk. The main feature of the manufacture in time came to be the working into every conceivable fabric that form of silk known here as spun silk, and on the Continent of Europe as *chappe.* This is silk spun from pierced cocoons, floss, and waste, and whatever cannot be reeled. The fabrics from this material, though wanting in the high lustre of those made from reeled silk, are remarkable for their wearing qualities, their beauty actually increasing with wear. The extensive use of this material for dress goods and ribbons is quite recent; but these fabrics, as now made by Messrs. Cheney Brothers, are recognized as cheaper and better than any goods of their grade in the market. The leading articles produced in this establishment are black and colored gros-grain silks, which have obtained a wide-spread reputation for their cheapness and good wearing qualities, as compared with imported goods of corresponding grades and weight. Ribbons of all colors and widths, which are among the most popular brands in the market, and a great variety of silks for the millinery and trimming trade,—for parasols, and for hat and fur

linings. The expert Judges at the Exhibition recognized in their award to Messrs. Cheney Brothers the "high degree of excellence of the piece goods and ribbons exhibited, and the perfect manipulations of the spun silk in every form."

But the proud distinction of this establishment is not so much the unequaled character of the fabrics in its peculiar line, its army of fifteen hundred workmen, or its production exceeding two millions in annual value, as the manner in which it has solved the highest and most difficult of problems,—the securing commercial success, with the harmony of interest between the employer and the operative. It would seem that neither taste nor social science could devise happier adaptations for the wants of a manufacturing population than are found in the village of South Manchester. In a highly-kept park of seven or eight hundred acres, without a single inclosure, are scattered the beautifully-appointed factories and warehouses, the handsome residences of the proprietors, the churches and public halls, the convenient boarding-houses, and the two hundred dwellings of the workmen, each isolated, with a pleasant garden-plot, and provided with water, gas, and perfect sewerage. The large farm of the proprietors, near the village, furnishes a supply of milk and vegetables at moderate prices; and an extensive bakery contributes to the public convenience. The intellectual wants of the workmen are provided for by a first-class school, a library and reading-room, and a commodious hall for lectures and public entertainments. The dream of an ideal community seems here to be as completely realized as is possible with the inexorable conditions of labor and capital. It is gratifying to see that the enlarged views of the proprietors have been productive of commercial success. An obvious result of their system has been to secure and retain the best class of workmen. There has never been a strike in this establishment; a strike being held, in the words of one of the proprietors to the writer, "as disgraceful to the employer as to the operative."

Woven Goods of Reeled Silk.—To observe the American fabrication of silk in its most luxurious forms and in the utmost variety, we must leave New England, and seek a district in New Jersey and New York, comprising the city of Paterson, its chief centre, and outlying establishments in Brooklyn, Hoboken, and New York City. In this district, and particularly in Paterson, lying about twenty miles by rail from the great metropolis, may be seen, in successful activity, nearly every form of silk fabrication pursued in Europe. It is a law of the development of industries that they spring from some obscure germ, as the tree grows from its seed. Like the sewing-silk and the

spun-silk manufacture, the magnificent industry of Paterson grew out of the silk-culture of Connecticut. It was founded by Christopher Colt, Jr., whose father was a president of a Connecticut silk-manufacturing company, which existed from 1835 to 1839, and an enthusiast in the silk-culture. An uncle of Christopher Colt, Jr., was the inventor of the celebrated revolving-pistol, and had built a large factory in Paterson, then a town of about seven thousand inhabitants, for the manufacture of his pistols. He offered the fourth story of his mill, with power to drive machinery, to his nephew Christopher, for the establishment of a silk-mill. It was supplied with machinery and started; but at the end of three months it was closed, and the stock, machinery, and fixtures offered for sale. Happily at this time, namely, in 1839, John Ryle, of Macclesfield, England, who had learned the arts of the silk-manufacture in his native town, was attracted to this country by the glowing statements sent abroad by the promoters of the *Morus multicaulis* excitement, then at its height. He visited Northampton and Connecticut, witnessed the collapse of the multicaulis bubble and the extinction of the silk-manufacturing establishments which had embarked in the speculation, but only to be more vividly impressed as to the field which lay open in this country for silk-manufacture. Imparting his enthusiasm to a Mr. Murray, a capitalist, whom he fortunately met at Northampton, the latter was induced to buy out Colt's machinery and place Mr. Ryle in charge of the first successful silk-mill in Paterson.

In 1843, Mr. Ryle having become a partner with Mr. Murray, the firm employed fifty hands, and consumed eight thousand pounds of raw silk per annum, in the production of tram, sewing-silk, and twist. In 1846, Mr. Ryle was assisted by his brothers in England to buy out Mr. Murray's interest, and, being sole owner of the establishment, set some looms at work, and produced several pieces of dress silks. But this fabrication was not continued. In 1857–58 he employed from four to five hundred operatives, and consumed two thousand pounds of raw silk per week. For twelve years he was without any competitor in Paterson. His first successful rivals were Messrs. Hamil & Booth, who commenced business in Paterson as throwsters, in 1854, with twenty operatives, but who now give employment to nine hundred. Even as late as 1862, the manufacture of silk at Paterson was mainly restricted to the making of machine-twists, sewing-silks, and tram-silks, for the use of manufacturers of silk trimming located in other cities. Efforts were made, in the years 1846, 1849, and 1864, to introduce the weaving of broad silks; but the experiments were only successful in demonstrating the skill of manufacturers. In

1862–63 material improvements were made by the machinists of Paterson in the construction of the silk-spinning machinery required for the fabrication of fine trams and organzines, the yarns necessary for weaving broad silks; and a greater uniformity was attained in assorting the various sizes of yarns required for weaving, which was effected by the introduction of the processes known as *deniering* and *draining*.

In the mean time, the command of the domestic market, assured by the tariff of 1861, encouraged manufacturers in Baltimore, and in Williamsburg, New York, to embark in the weaving of ribbons, scarfs, neckties, etc. The establishment at Williamsburg was transferred, in 1867, to Paterson; and, under the name of William Strange & Co., now employs eight hundred operatives, turning out an annual product of ribbons of the value of over a million of dollars. There are now eight ribbon-manufacturers in Paterson, and the production of this single city is over one hundred thousand pieces of ribbon per month.

The permanent establishment of broad-silk weaving in Paterson dates from the period of 1866. It was first successfully effected there by the Phœnix Manufacturing Company, and was made successful through the production of the yarns before referred to. This establishment now employs nine hundred operatives, and is distinguished for its perfection in Jacquard weaving. At first, eighty per cent. of the broad silks made was used for ladies' ties. In 1872 other firms entered into broad-silk weaving. The increase in the number of looms was followed by variety in production, until, as at present, there is scarcely a product of European looms in millinery, and even the highest class of dress-silks, which does not find its rival in the Paterson factories.

The command of skilled labor, the admirable water-power, the vicinage to the metropolis, and, above all, the well-known advantages of centralizing the manufacturers in a special department of a textile industry, have led several important silk-manufacturers, first located in Boston, Williamsburg, Schoharie, New York, and New York City, to transfer their establishments to Paterson.

A prominent advantage of centralizing manufacturing establishments is the opportunity given for specializing certain departments of industry. This is shown at Paterson in the great success attained in an essential branch of the silk-manufacture,—that of dyeing. The concentration of silk-manufactures at this place has produced the largest and most perfectly appointed dyeing establishment in the country, in which a large part of the fabrics produced in Paterson are dyed on commission. The proprietors of this establishment, Messrs.

Weidmann & Greppo, educated in Europe, and related to eminent dyers in Lyons and Switzerland, have introduced the best processes and machinery known abroad. One group of machines just introduced for stringing and shaking the yarns, for the purpose of straightening and stretching them after being dyed, does with three or four men what formerly required the severe labor of sixty stout men. Their relations with Lyons and Zurich keep them promptly informed as to the latest improvements and fashions. Their exhibit of dyed silks was one of the most attractive, and that of black weighted silks was one of the most instructive, at the Exhibition. Four years ago the dyers of Paterson held that it was impossible to perfectly dye pure black silks in their establishments, on account of supposed defects in the water of the place. A dye is now given in black dress-silks fully equal to the celebrated black dyes of St. Chaumond, near Lyons. The American dyers of black silks refrain from the reprehensible practice of European manufacturers of heavily weighting their black silks by means of chemicals. It is said that the average of French black silks are weighted as high as one hundred per cent. The weighting may be carried, without detection by the eye, as high as three hundred per cent.; but very brief wear reveals the deception. It is by no means claimed that there is higher morality on the part of American manufacturers. But the sins of the producer for a domestic market fly back to him so promptly and certainly, in the form of reclamations, that interest compels honest fabrication.

"Dyeing," said the immortal Colbert, "is the *soul* of tissues, without which the body could scarcely exist." This is especially true of silks: the attainment of the arts of perfect dyeing is the overcoming of the last obstacle to a successful manufacture. Fashion, constant only in change, is perpetually varying her demand for new colors, hues, and tones. She is inexorable even as to the most delicate shades. A ribbon or dress-silk may become absolutely unsalable, at any moment, by a change of fashion. Hence the advantages which Paterson enjoys in the perfection of her dyeing establishments, and of a taste instructed by a vicinage to the great metropolis. The taste of the present times, it may be observed, demands the almost exclusive use of aniline dyes in colored silks. They are more vivid and enduring on silk than on any other raw material, and, though still comparatively fugitive, are no more so than the fashions. Black, brown, and drab are almost the only colors for which anilines are not used.

To recur to the more general features of the silk-industry of Paterson. Its importance is shown by the facts obtained from the

report of its Board of Trade of 1876: number of operatives, 8000; amount of silk used each week, 9000 pounds; number of ribbon-manufacturers, 8; number of broad-silk factories, 6; and about 150 hand-looms, worked by men in their own homes. Most of the spinners use their own silks. The average wages of men weavers per week, $15; women and boys, $7. The value of the total production yearly is about $6,000,000.

We have dwelt at length upon the silk-industry of this city, because it is representative of its class. Important manufactories of woven silks, broad goods, and ribbons are found in West Hoboken and Union, in New Jersey, and in New York City: such as those of Herman Simon, in Union; Givernaud Brothers, in West Hoboken; John N. Stearns & Co., and J. Silbermann & Co., in New York City, etc. All the silk-manufacturing establishments of New York and New Jersey, including those of Paterson, may be said to be manufacturing appendages of the city of New York. The manufacturers nearly all have their warehouses and partners in the city, or visit it daily, and the goods are dispatched each day to the city sale-rooms. Some were originally importers of silk goods; others still continue importing in connection with their manufacturing operations. Thus a knowledge of the wants of the trade, of the changes of fashions, of the coming styles, is secured, which would be unattainable except through the influences of a great metropolis.

A few words may be given to some of the improvements made in the silk fabrication, which may be observed in the centre of manufacture now under review. Machinery for throwing has recently been introduced at Paterson, by which a spindle which formerly made three thousand five hundred revolutions per minute now makes seven thousand, doing its work as well as that more slowly revolving. It is claimed that these machines, some of which contain nearly seven hundred spindles, are capable of producing double the amount of work per spindle than can be done with the largest European frames; and that they can be managed by two attendants, one on each side. Winding, which ten years ago cost by piece-work one dollar per pound, costs now forty-five cents; the girls earning more than at old prices before the improvements. A new Swiss machine, just introduced, reduces the cost of warping from ten cents to five cents. The old machines, moved by hand, contained eighty bobbins; the new one, moved automatically, contains three hundred. A new loom for weaving hat ribbons makes two hundred and fifty shots in a minute; each loom is independent, making from thirty-six to fifty yards per day, and one girl tends eight looms.

But the most notable improvement is the absolutely successful achievement of weaving the very highest class of dress gros-grains, black and colored, by power. This has been accomplished by the Messrs. Simon, at Union, New Jersey, about fifteen miles from Paterson. Mr. Simon, educated as a civil engineer in the technical schools of Europe, has combined the various improvements observed by him abroad and in this country into an automatic loom; upon which, with the attendance of a boy of twelve or fourteen years old, sixteen yards of broad gros-grain silks may be woven per day,—the cost being eleven cents per yard. The production of eighty looms in this establishment has this average. We are assured that no first-class goods are woven abroad by power. These goods can therefore be made more cheaply here than at Lyons. These looms, with their products, won the admiration of our associate, Mr. Gebhard, who remarked "that he had never seen such goods made upon power-looms, and had no idea that such work could be performed automatically."

Silk Braids, Trimmings, and Laces.—This department of the silk-manufacture employed in 1876 two thousand seven hundred and fifty-three operatives; more than three-fifths were women. The founder of this branch of industry in the United States—if, indeed, he may not claim to be the pioneer of the industry as a whole—was William H. Horstmann, who, having learned the trade of silk-weaving in France, established himself in Philadelphia, in 1815, as a manufacturer of silk trimmings. In 1824 he introduced from Germany the use of plaiting- or braiding-machines; and, in 1825, the use of the first Jacquard loom employed in this country. By means of the various improvements introduced by him and his successors, his sons and grandsons, the house of William H. Horstmann & Sons has become one of the largest in the silk-manufacture now existing in this country. Its vast warehouses and sale-rooms in Philadelphia bewilder the eye with the number and variety of fabrics; including, indeed, the whole range of narrow textile fabrics,—bindings, braids, fringes, dress trimmings, coach and military equipments, theatrical goods, gold and silver laces, and embroideries. Two other large houses in Philadelphia, viz., J. C. Graham and Homer, Colladay, & Co., vie with the older house in the production of this class of goods. Their houses were established about 1850. These manufacturers have most contributed to give Philadelphia its reputation as the chief seat of the general manufacture of trimmings in the United States. In New York, the present house of J. Maidhoff & Co. was established in the manufacture of dress trimmings in 1849. In this city, Louis Franke is also prominently identified with the manufacture of silk fringes,

cords, and tassels. In Connecticut, Tobias Kohn, of Hartford, now president of the Novelty Weaving and Braid Works, established the manufacture of gimps, fringes, and tassels as early as 1848. An expert in this department of the silk fabrication observes that "the home manufacturers so fully supply the demands for the dress-trimming trade that there are very few colored dress and cloak trimmings imported. The variety of patterns for sale at the trimming-stores is so great that ladies find no difficulty in perfectly matching the color of their dresses. While thus meeting all the requirements of taste, the American fringes and trimmings are in general of the best material. Being made of pure silk, they will usually outlast the garment they ornament. They contrast in this respect with imported goods of similar appearance, but made from inferior silk, and hence apt to fade by exposure, or to wear out and fall off. Greater care in the processes by which they are made has also contributed to the notable superiority of American trimmings."

The manufacture of silk laces by means of the most modern and approved European machinery has been undertaken on a large scale, with high success, by A. G. Jennings, of the Nottingham Lace-Works, Brooklyn, New York; the machines made in England having cost over one hundred thousand dollars. The products of the works are principally silk guipure laces, and black thread and silk blonde laces for trimmings, Brussels spot-net and grenadine veilings, silk purling for trimmings, and silk-lace ties and scarfs. It is claimed that the lace goods are superior to those ordinarily imported, from being made of pure silk. The exhibit of these goods at Philadelphia received an award for excellent fabrication, and for "illustrating an important manufacture just introduced into the United States by the exhibitor."

General Observations.—Having considered the characteristics of the three leading departments of the silk-manufacture in this country, our remaining observations must apply to the industry as a whole. It is believed that, as a whole, American silk machinery, in efficiency, is equal, and in some respects superior, to that abroad. As to our fabrics, first in acknowledged excellence are our machine-twists and sewing-silks, articles of first necessity in the manufacture of boots, shoes, and clothing, and in the household economy of every home. The machine-twists are produced of such quality and at such prices as entirely to prevent the importation of foreign twists, and sewing-silks are imported only to satisfy the lingering prejudice against domestic productions. Our spun-silk fabrics have no foreign rivals, in quality and prices. In ribbons, we supply two-thirds of the demand of our own market, and in plain goods can fairly compete in quality with the

products of St. Etienne. In trimmings, even with their infinite diversity, there is no article made abroad which is not or may not be reproduced here. In broad silks, each of the last five years has seen the achievement of some new fabric, advancing from millinery to dress silks, overcoming all the difficulties of Jacquard weaving, and thence to brocade and damask silks. Our manufacturers have in the last year seen accomplished, on a large scale, the fabrication of colored and black gros-grain dress-silks, which are pronounced, not by the makers, but by rival manufacturers, to be absolutely equal in quality, while cheaper in price, to the very best imported silks. We are still, however, far from the position in the silk-manufacture to which we should aspire. In the higher fabrics, we are wanting in originality and a national character of design. The widest field for artistic work, that of the fabrication of upholstery stuffs, is almost wholly unexplored. We have made no bolting-cloths, have done nothing in velvets, and still allow the silk plushes for hats (so enormously consumed here) to be made abroad. With all the excellences of our machinery, we are too dependent upon foreign workmen for skill in manipulation. Technical and art schools, which shall develop native taste and skill, can alone give a national character to the higher fabrics of this industry.

These general observations cannot be more appropriately closed than by a summary of the American production, as furnished by that model industrial institution, the Silk Association of America:

VALUE OF PRODUCTS, CLASSIFIED BY ARTICLES, MANUFACTURED IN THE YEAR ENDING DECEMBER 31, 1876.

	Pounds.	Value.
Tram	369,132	$2,768,490
Organzine	184,567	1,614,961
Spun silk	140,000	805,000
Fringe-silk	33,862	203,172
Floss-silk	5,488	35,428
Sewing-silk	82,895	951,460
Machine-twist	468,916	6,301,059
Dress goods	.....	1,350,535
Millinery and tie silks	.....	1,679,166
Women's and men's scarfs	.....	119,946
Handkerchiefs	.....	927,000
Foulards	.....	472,000
Ribbons	.....	4,526,556
Laces	.....	220,000
Coach laces	.....	24,500
Veils and veiling	.....	16,518
Silk hose	.....	3,200
Braids and bindings	.....	315,000

	Pounds.	Value.
Military trimmings	.....	$28,000
Upholstery trimmings	.....	526,036
Ladies' dress trimmings	.....	3,705,076
Total products, 1876	1,284,860	26,593,103

	Pounds.	Value.	
Reeled silk consumed	1,144,860	$11,874,570	
Spun silk consumed	140,000	805,000	
Total silk threads	1,284,860	12,679,570	12,679,570
Consumed in sewings and twist	551,811	7,252,519	
Consumed in weaving	733,049	$5,427,051	$13,913,533

THE AMERICAN EXHIBITS OF SILK.—Although much material furnished by the Exhibition has been incorporated in the preceding pages, the features of the display of products of the silk-industry at the Exhibition demand a special notice.

The position accorded to the American silk exhibits was an exceedingly advantageous one. Instead of being thrust on one side or into a corner, it had the post of honor at the east end of the Main Building, on the central aisle; and thus naturally attracted the first attention of the visitors who made a systematic survey of the Exhibition. The show-cases in which the goods were displayed exhibited the good taste so peculiarly requisite in this industry. Although various in construction and ornamentation, there was a general resemblance, which gave agreeable unity to the display. Inside the cases some of the goods (as those of spooled silk) were arranged in architectural devices, giving the effect of towers, domes, and arches. In others, the richness of fabrics alone sufficed to give brilliancy to the displays. The arrangement of the dyed silks, so as to give prismatic effects, was peculiarly attractive. No visitor could fail to feel that, if this exhibit had been wanting, the American display of textiles would have lost its chief charm, and American patriotism one great source of its complacency. In Machinery Hall, and in the Women's Pavilion, different processes of the silk-manufacture were illustrated, on a large scale, by several different manufacturers. The actual operations of reeling, twisting, spooling, and weaving—in some cases by the Jacquard attachment—gave delight and instruction to curious throngs. The newest American machinery—especially the "two-decker" spinning-frame, constructed by the Danforth Locomotive & Machine Company, containing winder, doubler, spinner, and reeler in one—attracted the admiration of experts.

These exhibits were equally surprising to foreign visitors and to

our own people. High tributes have already come back to us from abroad: the French publicist, Jules Simonin; the Swiss Commissioner-General at the Exhibition; and a well-instructed writer in a paper published in Macclesfield, the headquarters of the English silk-industry,—having pointed out the exhibits at Philadelphia as proofs of the competition which their countrymen must expect in this country.

Having given the names of the principal foreign exhibitors in this department, we cannot do less for our own countrymen. In describing the exhibits, to avoid any possibility of error, the writer has adopted substantially the language of the official awards. The exhibitors are grouped according to the departments they pursue, and are named irrespectively of merit,—no numerical scale of excellence being admitted by the rules of the Exhibition:

J. H. HAYDEN & SON, *Windsor Locks, Conn.*

Slack and medium twist, of great brilliancy, strength, and regularity.

M. HEMINWAY & SON, *Watertown, Conn.*

Machine- and sewing-silks, perfect in quality of material, color, and workmanship.

HOLLAND MANUFACTURING CO., *Willimantic, Conn.*

Machine-twist and sewing-silks; highly meritorious for the excellent quality of raw material, and the preparation for the various purposes.

SEAVEY, FOSTER, & BOWMAN, *Boston, Mass.*

Sewing-silks, of great uniformity and general excellence.

BELDING BROTHERS & CO., *Rockville, Conn.*

Machine- and sewing-silks, of good color, strength, smoothness, and quality.

AUB, HACKENBURG, & CO., *Philadelphia, Pa.*

Sewing- and embroidery-silks, meritorious for great beauty and brilliancy of color; button-hole twist and saddler's silk highly commendable.

NONOTUCK SILK CO., *Florence, Mass.*

Sewing-silks and machine-twist; great superiority as to strength and regularity, evincing extreme care in the manufacture.

S. M. MEYENBERG, *Paterson, N. J.*

Millinery silks and upholstery satins, of superior quality and finish; ladies' scarfs, of excellent color and design.

JOHN N. STEARNS & CO., *New York, N. Y.*

Brocade silks, of superior styles and quality; twilled silks, well made, and meritorious in every respect.

DEXTER, LAMBERT, & CO., *Paterson, N. J.*

Millinery silks, well made, and of good colors; brocade silks, of excellent manufacture.

CHENEY BROTHERS, *Hartford* and *South Manchester, Conn.*

Spun silk, in every form, perfectly manipulated; piece goods and ribbons made thereof, evincing a high degree of excellence.

NEW YORK WOVEN LABEL MANUFACTURING COMPANY, *New York, N. Y.*

Woven silk labels and *fac-simile* of signature of Declaration of Independence, of good execution.

FREDERIC BAARE, *Paterson, N. J.*

Black figured silks, made in an improved and superior manner; millinery goods, of good manufacture.

HAMIL & BOOTH, *Paterson, N. J.*

Figure, dress, and millinery silks, plain satins, serges, and silk ribbons, of excellent manufacture and material.

WERNER, ITSCHNER, & CO., *Philadelphia, Pa.*

Faille, fancy, and Jacquard ribbons, of very good manufacture both as to color and combination of material.

B. B. TILT & SON, *Paterson, N. J.*

Brocade silks and handkerchiefs, of superior quality and workmanship.

WILLIAM STRANGE & CO., *Paterson, N. J.*

Plain and fancy ribbons, of good materials, well made in every respect; silk and millinery ribbons, of great beauty and superior quality.

LOUIS FRANKE, *New York, N. Y.*

Silk fringes, dress trimmings, and tassels, of the best material, excellent in style and manufacture.

SUTRO BROTHERS, *New York, N. Y.*

Braids of great regularity and excellent manufacture.

DALE MANUFACTURING COMPANY, *Paterson, N. J.*

Silk and mohair braids, fancy cords and trimmings, of great beauty and excellent workmanship.

WILLIAM H. HORSTMANN & SONS, *Philadelphia, Pa.*

Dress, carriage, and upholstery trimmings, of great excellence and beauty in style, material, and execution.

A. G. JENNINGS, Nottingham Lace Works, *Brooklyn, N. Y.*

Guipure, cashmere, and other lace and trimmings and net goods, of excellent fabrication.

WEIDMANN & GREPPO, *Paterson, N. J.*

Black and colored dyed silk; compares well with the production of the best European establishments.

EXHIBITS OF AMERICAN COCOONS AND RAW SILK.—Although we have waived the consideration of the foreign products of raw silk, the only two American exhibits of this material were so interesting and instructive that they deserve an extended notice. While the silk-culture has ceased in all the older States, it has recently been attempted, with sanguine hopes of success, in California and Kansas.

The planting of mulberries for the feeding of silk-worms was first undertaken at San José, California, in 1856, by M. Prevost, a botanist from Normandy, France; but the public attention was then so occupied with gold mining that the trees were unsalable, and M. Prevost abandoned their culture. A small number of trees was also planted by a Swiss gentleman,—M. Mueller, of San José,—who, in 1861, imported a few silk-worm eggs. The worms raised were fed upon the trees before planted, and the results obtained were so excellent as to revive the interest of M. Prevost, who recommenced the planting of mulberries and raising of silk-worms, which he continued until the time of his death, in 1869; he having in the mean time distributed

silk-worm eggs, gratuitously, to persons in various parts of the State. The interest in sericulture thus became so general in the State that the Legislature of California provided by law that a bounty of $250 should be paid for every 5000 newly-planted mulberry-trees, and $300 for every 100,000 cocoons produced in California. The object of the law was defeated by the planting by speculators, for the bounty, of several millions of the worthless multicaulis mulberry, and the law was repealed. In 1866, Mr. Joseph Neumann, of German birth, imported machinery for the fabrication of silk, and invented a reeling-machine for winding the raw silk from the cocoons. In 1867 he reeled the first skein of raw silk produced in California. In 1869 he produced 130 pounds of raw silk, and made from it two large flags,—one of which he presented to the State, and the other to the National Government. Meeting, like most pioneers, with but little commercial success in his attempts to manufacture silk, he finally abandoned the fabrication for the production and reeling of raw silk. His very large exhibit of cocoons and raw silk, and his exhibition of worms feeding and in different stages of growth, attracted great interest, and received from the expert Judges the following award: "A very good collection of cocoons and raw silk, of a variety of races, highly commendable for the successful attempts in the introduction of this important branch of industry."

The statements made by Mr. Neumann to the Judges, in regard to inducements for sericulture in California, were so interesting and important that they deserve a wider publication.

He regards California as better adapted for the silk-culture than almost any country in the world. He said, in regard to climate, that—

"The mulberry-trees in most parts of the State grow ten months in the year (from February to the end of November); so that worms can generally be fed uninterruptedly. Spring, summer, and fall are uncommonly dry, consequently the food of the worms is dry. The mulberry-tree throws out new branches and leaves four times a year, and worms can be fed from the fifteenth day with branches. In some localities in California trees five years old surpass those of fifteen years in Europe. The leaves are much larger, also, and one can gather six or eight times as much as in Europe in the same time. Thunder-storms do not occur during the feeding-season, and the worms consequently are not disturbed. The dryness of our atmosphere prevents the remains of the leaves which the worms do not consume from decaying, and the beds need not be cleaned more than twice in a season. We have proved that the cocoons enlarge from year to year."

In Kansas, sericulture has been attempted by E. V. de Boissiere, a French gentleman of means, who has set his heart upon surrounding his chosen home with a colony of operatives employed in the silk-culture and manufacture. He has built a mill for the manufacture of silk goods, and is confident that the silk to supply it will be produced in his neighborhood. His exhibits of raw silk and cocoons at Philadelphia were conclusive as to the favorable influences of the soil and climate of Kansas for sericulture. The remarkable character of the cocoons exhibited by M. de Boissiere so much impressed Mr. Le Boutillier, one of the American Judges of silk in Group IX., that he requested Mr. Hayami Kenzo, of Japan, a member of the group specially expert in raw silk, to give him his personal observations. Mr. Kenzo thus replies, in a note to Mr. Le Boutillier, now before the writer:

"Having examined the cocoons from Kansas, we marked them as good as the best cocoons from France, Italy, and Japan. Having a doubt as to the correctness of our judgment, I looked them over again with great care, and came to the same conclusion as we had before. I suppose the mulberry-trees are cultivated in very rich soil, and, being not so old, are especially suited for feeding silk-worms. The chrysalids are large and healthy, and several have been almost entirely transformed into butterflies. The best silks in good weights will be obtained from these cocoons."

It is obvious that a protective duty on raw silk for the general encouragement of sericulture in this country would not be justified. The culture offers no prospects of success, except in a few favorable localities; and a duty on the raw material would be oppressive to the manufacture. The question of encouraging the silk culture by legislative provisions addresses itself only to the governments of the States which are specially adapted by soil and climate to this culture. The American Judges in Group IX. were so impressed by the exhibits and facts presented by Mr. Neumann and M. de Boissiere, that they were prepared to indorse memorials which might be addressed by these gentlemen to Legislatures of their respective States, asking for bounties on silk productions. The members of the group, however, separated without taking more definite action in this matter.

In concluding the report on wool, we gave the yearly production throughout the world. We cannot do less for the more costly material. The following statement, prepared by Mr. Franklin Allen, is believed to be a near approximation to the yearly production of raw silk in the several silk-producing countries of the world at the present time:

China and Chinese Empire	$92,928,000
Japan	19,800,000
Persia, Turkistan, etc.	6,250,000
Syria and Asia Minor	8,500,000
Italy	59,250,000
France	31,246,800
Turkey in Europe	7,920,000
Spain and Portugal	1,884,000
Greece	1,087,000
Morocco	300,000
Austria-Hungary	3,087,600
India	35,200,000
America	100,000
	$267,553,400

REPORTS ON AWARDS.

GROUP IX.

1. **M. G. Diena, fu Jacob, Spilimberto, near Modena, Italy.**

SILK COCOONS AND RAW SILK.

Report.—A very fine exhibit of cocoons; also very elastic and clear grèges of great beauty.

2. **E. Meyer & Co., Milan, Italy.**

RAW SILK.

Report.—Raw and thrown silks, of remarkable quality, both as to regularity, purity, and elasticity.

3. **Ibrahim Bogdanof-Teregoulof, Tiflis, Russia.**

SILK COCOONS.

Report.—A variety of silk cocoons, principally of new races, showing great care, and worthy of commendation for successful efforts in introducing this new branch of industry.

4. **E. V. de Boissiere, Williamsburg, Kansas, U. S.**

SILK COCOONS.

Report.—Commended for successful attempts to raise silk-worms, and for cocoons of good quality.

5. **Baumann Aelter & Co., Zurich, Switzerland.**

SILKS.

Report.—Commended for a high degree of perfection as to texture, regularity, beauty, and finish in fine goods.

6. **Antonio Pascual & Co., Reus, Tarragona, Spain.**

BLACK SILKS.

Report.—Black silks of good manufacture, color, and finish.

7. **Sons of Oñate, Valencia, Spain.**

RAW SILK AND COCOONS.

Report.—An excellent assortment of silk cocoons and raw silk, entitled to the highest commendation.

8. **Faustino Martinez, Seville, Spain.**

RAW SILKS.

Report.—A very good show of cocoons; also excellent raw silk of great purity and elasticity.

9. **Emelianof & Rochefort, Moscow, Russia.**

SILK AND WOOL DRESS GOODS.

Report.—A fine assortment of fancy dress goods, silk and wool, in rich qualities and tasteful combinations.

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10. **Zolotaref & Ribakof, Moscow, Russia.**

WORSTED AND SILK DRESS GOODS.

Report.—A great variety of fancy dress goods of worsted and silk, in very tasteful styles and at moderate prices.

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11. **A. & W. Sapojnikoff, Moscow, Russia.**

DAMASKS OF SILK AND SILVER AND GOLD.

Report.—A superb display of the richest silk and gold and silver brocades, unrivaled in every respect.

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12. **Sergius Zoobkof, Khomootovo, Moscow, Russia.**

PLAIN SILKS.

Report.—Colored failles of rich quality, excellent material, and great brilliancy; high degree of merit.

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13. **Alexis Fomitchef, Moscow, Russia.**

SILKS.

Report.—Rich figured failles and silk cashmeres of great beauty and taste.

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14. **Pokrovsky Sisterhood of Charity, Moscow, Russia.**

SILK COCOONS.

Report.—A good display of silk cocoons of fine quality.

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15. **Kondrashef Brothers, Grebenevo, Moscow, Russia.**

SILK GOODS.

Report.—Commended for plain black and colored failles, excellent in color and manufacture; also for very well made upholstery damasks.

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16. **J. H. Van Bellingen & Max Suremont, Antwerp, Belgium.**

BLACK SILKS.

Report.—Commended for superiority of manufacture, fast colors, and splendid effects.

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17. **Woldemar Wimmer, Annaberg, Germany.**

GOLD AND SILVER BRAIDS.

Report.—A very creditable assortment of silk and gold braids and galoons.

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18. **Escales & Hatry, Saargemünd, Germany.**

BLACK SILK PLUSHES.

Report.—Hatters' black silk plushes of remarkable perfection in color and finish.

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19. **Gressard & Co., Hilden, Germany.**

SILK FOULARDS.

Report.—A superb assortment of well-finished foulards and handkerchiefs.

20. Carl Mez & Sons, Freiburg, Baden, Germany.

SEWING SILK.

Report.—An assortment of colored and black sewing silk, of great brilliancy in color and finish.

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21. Farriols & Son, Barcelona, Spain.

BLACK SILKS.

Report.—A great variety of black cashmere silks in fine grades, of excellent manufacture in every respect.

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22. Benito Malrehy, Barcelona, Spain.

SILK DAMASKS AND BROCADES.

Report.—A great variety of curtain and furniture silk damasks, brocades, and trimmings, of good colors and excellent manufacture.

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23. Eduardo Reig & Co., Barcelona, Spain.

SILK CRAVATS AND FICHUS.

Report.—Good assortment of silk neck-handkerchiefs, well made, and very effective for the price.

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24. S. Rütschi & Co., Zurich, Switzerland.

SILK GOODS.

Report.—Black and colored fabrics at very moderate prices, showing great care in the manufacture; the satin du chene particularly well made.

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25. Ryffel & Co., Stæfa and Zurich, Switzerland.

SILKS.

Report.—The marcelines (satinets) exhibited are superior in texture, color, and finish, and can scarcely be excelled.

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26. Emil Schærer & Co., Zurich, Switzerland.

SILKS.

Report.—Commended for good taste in style and coloring, and for stripes which are very regular in the manufacture, and show great progress.

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27. J. Schwarzenbach-Landis, Thalweil, near Zurich, Switzerland.

SILKS.

Report.—Colored failles and changeables of great regularity and beauty, at moderate prices, well adapted for the best markets.

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28. Joh. Stapfer's Sons, Horgen, Zurich, Switzerland.

SILKS.

Report.—An exhibit of great merit, evincing considerable progress in the manufacture of plain, striped, and checked silk goods of perfect taste, at low prices.

29. **Stünzi & Sons, Horgen, Zurich, Switzerland.**

SILK GOODS.

Report.—Cotton-back satins, which in price compare favorably with the best products of other countries.

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30. **Jansen, Bodek, & Hertz, Riesbach, near Zurich, Switzerland.**

SILK GOODS.

Report.—Good styles of cravat materials at low prices.

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31. **Y. Tamamura, Ishi-i-mura, Shimodzuke, Japan.**

RAW SILK.

Report.—Very good specimens of raw silk of excellent quality, carefully prepared.

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32. **M. Marunaka, Kanazawa, Kaga, Japan.**

RAW SILK.

Report.—Very superior raw silk.

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33. **Yo. Suzuki, Yamura, Kai, Japan.**

PLAIN SILKS.

Report.—Plain, colored, and checked silks, well woven and of good appearance.

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34. **Yamamoto Kinu, Susakamura, Shinano, Japan.**

SILKS.

Report.—Two productions of silks made from the cocoons of new silk-worms feeding on the native walnut; highly interesting.

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35. **Y. Nakagawa, Kiyoto, Japan.**

SILK CRAPES.

Report.—Excellent specimens of white silk crapes, perfect in color, and of great solidity.

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36. **S. Nishimura, Kiyoto, Japan.**

SILK CRAPES.

Report.—Dyed and printed silk crapes, excellent in color and execution, principally the shaded specimens.

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37. **Y. Shibata, Hakata, Chikusen, Japan.**

SILK GOODS.

Report.—Silks for ladies' scarfs, of perfect manufacture.

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38. **S. Tomita, Kiyoto, Japan.**

GAUZES.

Report.—Well-made silk gauzes, commendable for their low price.

39. **Captain Luiz Ribeiro de Souza Rezende, Rio de Janeiro, Brazil.**

RAW SILK AND COCOONS.

Report.—A variety of specimens of cocoons and raw silk, of great beauty and excellence, both as to the nature of the silk and its preparation, and meriting high commendation for the introduction of this important branch of industry.

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40. **Antonio Luiz dos Santos Reis, Piratinim, Brazil.**

RAW SILKS.

Report.—Commended for successful experiments in raw silks.

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41. **H. Kono, Chikuma-Ken, Japan.**

SILKS.

Report.—Samples of silk, natural color, from the silk of the worm feeding on the oak; new and very remarkable.

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42. **Dr. Nicolau J. Moreira, Rio de Janeiro, Brazil.**

SILK COCOONS.

Report.—A highly curious specimen of a new silk-worm feeding on forest trees.

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43. **David José da Silva & Son, Oporto, Portugal.**

DAMASK OF SILK AND GOLD.

Report.—Gold and silver damasks, for church purposes and upholstery, of good design and excellent manufacture.

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44. **Viuva Ferreira Campos & Co., Oporto, Portugal.**

GOLD BROCADES AND MILITARY TRIMMINGS.

Report.—Gold brocades, and silk and silver cloth, in good taste and of excellent manufacture; gold and silver military trimmings in great variety, and well made.

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45. **Jacintho P. Valverde Miranda Vasconcellos, Oporto, Portugal.**

RAW SILK.

Report.—Raw silk of excellent quality in every respect.

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46. **F. Cabral Paes & Sons, Vizeu, Portugal.**

RAW SILK AND COCOONS.

Report.—Very fine silk cocoons, and silk spun thereof; quality and preparation highly commendable.

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47. **José Antonio Reis, Moncorvo, Bragança, Portugal.**

RAW SILK.

Report.—Raw silk of great fineness, excellent spinning, and general effect.

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48. **Simão Ribas, Guarda, Portugal.**

RAW SILK.

Report.—A fine exhibit of very well spun tram, of great pureness and tenacity.

49. **Antonio de Sa Pereira, Sta. Maria, Bragança, Portugal.**

RAW SILK.

Report.—Raw silk of excellent quality, as to the natural tenacity, and of very regular preparation.

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50. **National Silk Spinning and Weaving Co., Lisbon, Portugal.**

RAW COCOONS AND SILK UPHOLSTERY GOODS.

Report.—A very fine show of silk cocoons; also raw silk of excellent quality and silk upholstery goods of good manufacture and excellent design.

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51. **S. Trebitsch & Son, Vienna, Austria.**

BLACK SILKS AND CRAVATS.

Report.—Black silks and silk cravats, well made, of good color and appearance, and from their low price adapted for a large consumption.

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52. **Carl Hetzer & Sons, Vienna, Austria.**

SILK VELVETS.

Report.—Black and colored silk velvets, cotton back, made two pieces together, of good manufacture and excellent result.

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53. **C. G. Hornbostel & Co., Vienna, Austria.**

SILKS AND SILK AND COTTON GOODS.

Report.—Fancy silks and mixed fabrics of good design and effect.

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54. **F. Reichert's Sons, Vienna, Austria.**

SILK VELVETS AND SILK GOODS.

Report.—Colored and black velvets and silks of excellent manufacture; specialty of white velvet of great purity.

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55. **Filippo Dalla Pozza, Vicenza, Italy.**

RAW SILK.

Report.—Very fine and well-spun raw silk, very clean, and of great tenacity and elasticity.

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56. **Ugolino Chiericoni, Messina, Italy.**

SILK COCOONS.

Report.—Silk cocoons of great beauty and superb quality.

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57. **Leopoldo Cagliani, Milan, Italy.**

SILK VELVETS.

Report.—Silk colored velvets of good color and very creditable manufacture.

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58. **Alberto Keller, Milan, Italy.**

RAW SILK.

Report.—Raw silk of great superiority in every respect.

59. **Erede Salomon Sinigaglia and Lattes, Turin, Italy**

RAW SILK.

Report.—An excellent show of raw silk of remarkable purity, perfect in preparation.

60. **Madame Elbis, Constantinople, Turkey.**

SILK EMBROIDERY.

Report.—Curiously-wrought silk embroidery, showing great skill and taste.

61. **Nicholas Bolad, Damascus, Turkey.**

STRIPED AND FIGURED SILKS.

Report.—Striped and figured silks, of good taste in good colors and combination of materials.

62. **Emanuel G. Marridas, Kiopler, near Brousse, Turkey.**

RAW SILK.

Report.—A remarkable display of white and yellow raw silk of great beauty and tenacity.

63. **Gondard, Cirlot, & Martel, Lyons, France.**

FOULARDS.

Report.—Commended for the elegance of design, brilliancy of colors, and general good taste of printed foulards.

64. **E. P. Schilizzi, Adrianople, Turkey.**

RAW SILK.

Report.—Very fine, clean, and strong white and yellow raw silk.

65. **Merouk Oglou, Brousse, Turkey.**

SILK GOODS.

Report.—Very well made, and of good texture.

66. **Hu Kwang Yung, Hang Chow, China.**

PLAIN SILKS.

Report.—Plain colored satins of excellent manufacture and superior finish.

67. **K. A. Almgren, Stockholm, Sweden.**

SILKS.

Report.—Colored failles, very well made from the best material, and of brilliant lustre.

68. **Fy Cheong, Canton, China.**

FANCY AND PLAIN SILKS.

Report.—A very fine exhibit of colored and figured silk goods, showing marked improvements over former productions.

69. **Hadji Hakim Brothers, Aleppo, Turkey.**

SILK GOODS.

Report.—White and gold damask of beautiful workmanship.

70. **Imperial Silk Manufactory of Hiereké, Turkey.**

SILK FABRICS.

Report.—A superb display of rich brocade silks, excellent in design, color, and execution.

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71. **Estate of Bir-Abu, Bellach, Egypt.**

SILK COCOONS.

Report.—An exhibit of cocoons of great beauty and excellent nature of silk.

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72. **Giovanni Tramontina, Cairo, Egypt.**

RAW SILK AND COCOONS.

Report.—A fine exhibit of cocoons and specimens of raw silk of great regularity and tenacity, commendable especially on account of the difficulties of this new branch of industry.

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73. **Audibert, Monin, & Co., Lyons, France.**

SILKS AND POPLINS.

Report.—Well-made black Siciliennes of great regularity and beauty of texture.

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74. **Jandin & Duval, Lyons, France.**

FOULARDS.

Report.—A great display of plain, figured, and printed foulards, elegant in design, taste, and execution.

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75. **J. P. Million & Servier, Lyons, France.**

SILK GOODS AND VELVETS.

Report.—Commended for superiority of manufacture of black silk velvets and colored silk goods.

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76. **Alex. Giraud & Co., Lyons, France.**

SILK GOODS.

Report.—Umbrella silks, of good color and manufacture.

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77. **Gillet & Son, Lyons, France.**

DYED SILKS.

Report.—Fine assortment of black-dyed silk, of superior shade and excellent workmanship; can scarcely be excelled.

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78. **Thomas Brothers, Avignon, France.**

RAW SILK.

Report.—Bright China tram and organzine, of very good quality and excellent preparation.

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79. **Jules Chabert & Co., Chomerac (Ardèche), France.**

RAW SILK.

Report.—Commended for French tram of great regularity and remarkable elasticity; also for Bengal organzine of excellent preparation.

80. **Louis Boudon, Saint-Jean-du-Gard, France.**

RAW SILK.

Report.—A remarkable exhibition of white and yellow raw silk, of extraordinary fineness, purity, and great regularity.

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81. **Arlès-Dufour, Lyons, France.**

RAW SILK.

Report.—A fine assortment of French raw silks of great beauty, and China organzine of great regularity and neatness.

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82. **Jurie & Co., Lyons, France.**

VELVETS AND SILKS.

Report.—A great variety of very well made black and colored plain silk velvets and dress silks.

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83. **Antoine Guinet & Co., Lyons, France.**

BLACK SILKS.

Report.—Black silks, very effective in appearance, in low and medium grades.

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84. **J. Boquet & Co., Amiens, France.**

SILK VELVETS.

Report.—Utrecht velvets in fine qualities and beautiful colors.

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85. **Weidmann & Greppo, Paterson, N. J., U. S.**

DYED SILK.

Report.—Commended for excellent production of black and colored dyed silk, comparing well with the best European establishments.

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86. **New York Woven Label Manufacturing Co., New York, N. Y., U. S.**

WOVEN SILK LABELS.

Report.—Woven silk labels of very good execution.

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87. **J. H. Hayden & Son, Windsor Locks, Conn., U. S.**

SEWING SILK.

Report.—Slack and medium twist sewing silk of great brilliancy, strength, and regularity.

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88. **Joseph Neumann, San Francisco, Cal., U. S.**

RAW SILK AND SILK COCOONS.

Report.—A very good collection of cocoons and raw silk of a variety of races, highly commendable for the successful attempts in the introduction of this important branch of industry.

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89. **M. Heminway & Sons Silk Co., New York, N. Y., U. S.**

SEWING SILK.

Report.—A full assortment of colored and black machine and sewing silks, perfect in quality of material, color, and workmanship

90. **Dale Manufacturing Co., Paterson, N. J., U. S.**

SILK, MOHAIR, AND FANCY BRAIDS.

Report.—A very fine display of silk and mohair braids, fancy cords and trimmings, of great beauty and excellent workmanship.

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91. **Sutro Brothers, New York, N. Y., U. S.**

SILK AND COTTON BRAIDS.

Report.—Braids of great regularity and excellent manufacture.

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92. **Louis Franke, New York, N. Y., U. S.**

SILK FRINGES AND BRAIDS.

Report.—Silk fringes, dress trimmings, and tassels, made of the best material, excellent in style and manufacture.

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93. **Holland Manufacturing Co., Willimantic, Conn., U. S.**

SEWING SILK.

Report.—Commended for a fine assortment of sewing silks of different kinds; also machine twist, highly meritorious for the excellent quality of raw material and the preparation for the various purposes; also for silk spinning and silk thread-testing machines.

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94. **S. M. Meyenberg, Paterson, N. J., and New York, N. Y., U. S.**

SILKS AND UPHOLSTERY SATINS.

Report.—Commended for very well made millinery silks and upholstery satins, of superior quality and finish; also for ladies' scarfs of excellent color and design.

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95. **John N. Stearns & Co., New York, N. Y., U. S.**

FIGURED AND TWILLED SILKS.

Report.—A handsome exhibit of brocade silks of superior styles and quality; also twilled silks well made, and meritorious in every respect.

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96. **Dexter, Lambert, & Co., New York, N. Y., U. S.**

SILK GOODS.

Report.—Commended for millinery silks, well made and of good colors; also for brocade silks of excellent manufacture.

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97. **Cheney Bros., Hartford and South Manchester, Conn., U. S.**

SILKS AND SILK RIBBONS.

Report.—Commended for perfect manipulation of spun silk in every form, and for piece goods and ribbons manufactured thereof, evincing a high degree of excellence.

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98. **Frederick Baare, Paterson, N. J., U. S.**

SILK GOODS.

Report.—Commended for black figured silks, made in an improved and superior manner; also for twenty-six inch millinery goods of good manufacture.

99. **The Central Commission of the District of Vizeu, Vizeu, Portugal.**

SILK COCOONS.

Report.—A very fine exhibition of raw-silk cocoons of superior quality.

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100. **The Imperial Ottoman Government, Constantinople, Turkey.**

COLLECTIVE EXHIBITION OF SILK GOODS.

Report.—Commended for an excellent and very complete display of the silk, gold, and mixed fabrics of the Ottoman Empire, collected from the various places of manufacture, and deserving the highest merit for taste and workmanship; also for a splendid display of carpets, of great beauty of design, harmony of colors, and excellent manufacture.

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101. **Pim Brothers & Co., Dublin, Ireland.**

SILK AND WOVEN POPLINS.

Report.—Black and colored hand-woven plain silk poplins, excellent in every respect; furniture damasks of superior effect and manufacture.

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102. **Charles A. Rickards, Leeds, England.**

SEWING SILK.

Report.—Sewing silk of excellent character, both as to quality, color, and preparation.

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103. **Fredr. Wurm, Adelaide, South Australia, Australia.**

SILK COCOONS.

Report.—A very good exhibit of cocoons, remarkable for such a short period of culture. The yellow silk shows great tenacity, and is very clean.

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104. **George Thorne, Sydney, New South Wales, Australia.**

SILK COCOONS.

Report.—A good assortment of cocoons of different races; commendable, considering the youth of the plantation.

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105. **Superintendent of Destitute Children's Asylum, Sydney, New South Wales, Australia.**

SILK COCOONS.

Report.—A fine show of cocoons; very creditable as first essays.

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106. **Mrs. Bladen Neill, Melbourne, Victoria, Australia.**

RAW SILK AND COCOONS.

Report.—A good exhibit of raw silk and cocoons, highly creditable from the fact that this branch of industry has only lately been introduced. The raw silk, particularly from the reproduction of Japanese and Grenoble cocoons, has great elasticity.

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107. **Sheldon & Fenton, London, England.**

SEWING SILKS.

Report.—Sewing silks of excellent quality and brilliant colors, in a variety of shades.

108. **Wm. Milner & Sons, Leek, Staffordshire, England.**

SEWING SILKS.

Report.—Sewing silks of excellent appearance for the prices quoted.

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109. **Mrs. Ann Timbrell, Collingwood, Victoria, Australia.**

RAW-SILK COCOONS.

Report.—A good display of raw-silk cocoons of a variety of races, very firm, and of good quality.

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110. **C. F. Chubb, Ipswich, Queensland, Australia.**

RAW-SILK COCOONS.

Report.—Good variety of raw-silk cocoons of different races.

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111. **John McDonald, Queensland, Australia.**

SILK COCOONS.

Report.—A very creditable assortment of raw-silk cocoons of good quality.

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112. **American Silk Label Manufacturing Co., New York, N. Y., U. S.**

WOVEN SILK LABELS.

Report.—A well-woven fac-simile of the signatures to the Declaration of Independence.

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113. **Hamil & Booth, Paterson, N. J., and New York, N. Y., U. S.**

PLAIN AND FIGURED SILKS.

Report.—A very fine exhibit of figured dress and millinery silks, plain satins, serges, and silk ribbons, of excellent manufacture and material.

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114. **Werner Itschner & Co., Philadelphia, Pa., U. S.**

SILK RIBBONS.

Report.—Commended for faille, fancy, and Jacquard ribbons of very good manufacture, both as to color and to combination of material; also for a good display of very suitable hat-bands.

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115. **Seavey, Foster, & Bowman, Boston, Mass., U. S.**

SEWING SILKS.

Report.—Commended for great uniformity and general excellence in manufacture of their sewing silks.

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116. **F. Thomas, Pont-des-Charrettes, France.**

RAW SILKS.

Report.—A fine collection of cocoons and beautiful organzine, superior in every respect.

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117. **Font, Chambeyron, & Benoît, Lyons, France.**

SILK VELVETS.

Report.—A fine assortment of black silk velvets of great evenness and lustre; the blacks beautiful.

118. **F. Brioude & Co., St. Etienne, France.**

VELVET RIBBONS.

Report.—Black velvet ribbons of good manufacture and finish, very well made in every respect.

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119. **Benoit, Tabard, & Co., Lyons, France.**

LINING SILKS.

Report.—A good assortment of black and fancy lining silks, well made.

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120. **Belding Bros. & Co., Rockville, Conn., U. S.**

MACHINE AND SEWING SILKS.

Report.—Machine and sewing silks of good color, strength, smoothness, and quality.

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121. **Aub, Hackenburg, & Co., Philadelphia, Pa., U. S.**

MACHINE AND SEWING SILKS AND BUTTON-HOLE TWIST.

Report.—A fine exhibit of sewing and embroidery silks and machine twist; the sewing and embroidery silks principally meritorious for great beauty and brilliancy of color; the button-hole twist and saddlers' silk highly commendable.

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122. **Nonotuck Silk Co., Florence, Mass., U. S.**

SEWING SILK AND SILK MACHINERY.

Report.—A splendid exhibit of a variety of sewing silks and machine twist of great superiority as to strength and regularity, evincing extreme care in the manufacture; also a fine collection of silk manufacturing machinery, embracing winding, doubling, spinning, and reeling machines, and spool-finishing machines; the latter of very ingenious construction.

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123. **B. B. Tilt & Son, Paterson, N. J., U. S.**

FIGURED SILKS AND SILK LOOMS.

Report.—Commended for brocade silks and handkerchiefs of superior quality and workmanship, excellent in color and style; also for a Jacquard ribbon-weaving loom and a figure silk loom, both of very good construction.

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124. **A. Hamelin Son, Paris, France.**

SEWING SILK.

Report.—Sewing silk of excellent quality and manufacture; a great assortment of very fine shades.

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125. **Jaubert, Audras, & Co., Lyons, France.**

BLACK SILKS.

Report.—Commended for excellence of manufacture and quality of material, and general superiority of black silks and satins.

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126. **Sevène, Barral, & Co., Lyons, France.**

SILK GOODS.

Report.—A good display of medium qualities; fine shades at reasonable prices.

127. **Poncet, Senior & Junior, Lyons, France.**

SILKS.

Report.—Commended for novelties in dress silks, of exquisite taste and perfect workmanship.

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128. **Faye & Thévenin, Lyons, France.**

COLORED SILK GOODS.

Report.—This exhibit has special merit in the superior manufacture of the plain silks as regards quality and color.

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129. **C. J. Bonnet's Sons & Co., Lyons, France.**

BLACK SILKS.

Report.—Commended for unrivaled productions of black silk fabrics, showing the highest state of perfection in silk manufacture.

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130. **Huber & Co., Paris, France.**

HATTERS' SILK PLUSHES.

Report.—Hatters' black silk plushes of remarkable perfection in color and finish.

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131. **Gourd, Croisat Son, & Dubost, Lyons, France.**

BLACK SILKS.

Report.—Commended for excellence, in every respect, of black silks, in medium and fine grades.

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132. **Gautier, Bellon, & Co., Lyons, France.**

SILK VELVETS.

Report.—A fine exhibit of plain black and colored velvets; specialty of rich goods of superior manufacture.

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133. **Joseph Puydebart & Son, Lyons, France.**

RAW AND SEWING SILKS.

Report.—Sewing silks, raw and dyed, of great regularity and excellent workmanship; specialty of saddlers' silk of great tenacity.

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134. **L. Dornon, Lyons, France.**

SILK GAUZES FOR BOLTING-CLOTH.

Report.—Commended for extraordinary fineness and great uniformity of texture.

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135. **Giron Bros., St. Etienne, France.**

VELVET RIBBONS.

Report.—A great display of very well made velvet ribbons.

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136. **J. B. Martin, Tarare, France.**

PLUSHES AND VELVETS.

Report.—Commended for superiority of manufacture, lustre, finish, and quality of black and colored plushes for hatters and milliners.

137. **Tapissier Son & Debry, Lyons, France.**

BLACK SILK.

Report.—Commended for the great care and general excellence bestowed upon the manufacture in all its stages.

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138. **Mauvernay & Co., Lyons, France.**

SILK GOODS.

Report.—Striped and fancy silks in medium grades, creditable for the price.

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139. **Bresson-Agnès & Co., Lyons, France.**

SILKS.

Report.—A very fine exhibition of rich damask silks; also novelties in figured crêpe du chine and printed cravats.

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140. **C. J. Servant & Co., Lyons, France.**

VELVETS AND SILKS.

Report.—Superior very wide black silk velvets of remarkable beauty, made of the best raw material of their own production.

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141. **L. R. Gascou, Montauban, France.**

SILK BOLTING-CLOTH.

Report.—Silk bolting-cloth of great regularity; perfect in execution.

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142. **Bardon & Ritton, Lyons, France.**

SILKS.

Report.—A fine exhibit of colored faille and gros-grain, which, for superiority of manufacture, purity of material, brilliancy of color, and beauty of finish, cannot well be excelled.

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143. **Collective Exhibition of the Weavers of Mineyama, Province of Tamgo, Japan.**

SILK CRAPES.

Report.—A very fine assortment of white and colored silk crapes, showing great perfection, principally those marked "Ikebe."

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144. **Government Establishment for Experimental Silk-Worm Breeding, Tokio, Japan.**

RAW SILK AND COCOONS.

Report.—An excellent exhibit of raw silk and cocoons, of great regularity, evenness, and tenacity, showing the best productions of this valuable industry, collected from the silk-spinning establishments of Tomioka, Yamanacho, Nihoumato, Kanazawa, and Nagano.

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145. **Egyptian Raw Silk Company, Oporto, Portugal.**

RAW SILK.

Report.—Very clean, strong, and elastic raw silks and sewing silks.

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146. **Brashnin Bros., Oriechovo-Zooevo, Moscow, Russia.**

SILK GOODS.

Report.—A creditable assortment of striped and checkered dress silks.

147. **Local Government of Tsurugaken, Japan.**

PLAIN FOULARD SILK.

Report.—White foulard, excellent in quality, at a remarkably low price.

148. **His Highness the Bey of Tunis, Tunis.**

SILK TISSUES AND MIXED FABRICS.

Report.—A great variety of silk, silk and gold, and mixed fabrics of Tunisian manufacture, all evincing great taste and excellent workmanship, and highly commendable for the great care bestowed upon this collection.

149. **Adlischweil Silk Goods Factory, Adlischweil, near Zurich, Switzerland.**

SILK GOODS.

Report.—Black and colored failles and taffetas, which are remarkably well made for the price, and on that account are calculated for a large and general consumption.

150. **Winterthur Silk Goods Factory, Winterthur, Switzerland.**

SILK GOODS.

Report.—A fine and varied assortment of all grades; power-loom umbrella silks, which are well adapted for the purpose intended; also good black cotton-back satins.

151. **Russian Government.**

RAW SILK AND SILK COCOONS.

Report.—A very fine display of raw silk and silk cocoons in great variety, all of excellent quality and purity, meriting high commendation, and showing great skill and care on the part of the Director, Mr. Lootchinsky.

152. **Government Office for Experimental Silk-Worm Breeding, Tokio, Japan.**

SILK-WORM BREEDING.

Report.—A very fine exhibit, showing the breeding of the silk-worm, with drawings, models, samples, and implements, showing great care in its preparation.

153. **The National Museum of Egypt, Cairo, Egypt.**

FIGURED AND BROCADED SILKS.

Report.—A splendid assortment and a great variety of national manufactures of silk and mixed fabrics, evincing great skill of workmanship and combination of colors, and meriting the highest praise for the good taste with which this collection has been made.

154. **India Museum, Kensington, London, England.**

SILKS AND MIXED FABRICS.

Report.—A splendid display of Indian productions of silk and mixed fabrics of classical taste and beauty.

155. **Imperial Maritime Customs, Shanghai, China.**

PLAIN AND FANCY SILKS.

Report.—A very fine collection of Chinese plain and fancy silks, highly meritorious for the improvement in the manipulation, workmanship, and uniformity; also an extraordinarily fine collection of raw silk, comprising a full assortment of all the qualities produced in the country.

156. Collective Exhibit from the Provinces of the Ottoman Empire.

RAW SILK AND COCOONS.

Report.—An excellent display of silk cocoons and raw silk of exceptional merit.

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157. L. J. Knowles & Bro., Worcester, Mass., U. S.

LOOMS.

Report.—Looms of good construction and workmanship.

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158. John Lang Currie, Larra, Derimallum, Victoria, Australia.

WOOL.

Report.—Three fleeces of lambs' and merino wool of superior quality and in good condition. The lambs' wool is specially good.

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159. Robert W. Scott, Franklin Co., Ky., U. S.

WOOL.

Report.—Commended for two pelts, with wool, illustrative of fleeces from sheep claimed to be a distinct breed, produced by the exhibitor, the wool of a fair quality for combing purposes; and for two excellent pelts from Angora goats.

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160. William Croskey, Hopedale, Harrison County, Ohio, U. S.

WOOL.

Report.—An exhibit of twelve samples of Saxony wool, of the highest excellence.

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161. Moses Stocking, Wahoo, Saunders County, Nebraska, U. S.

WOOL.

Report.—One fleece of merino rams' wool, of good weight and excellent quality.

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162. Atlas Manufacturing Co., Newark, N. J., U. S.

WOOL-BURRING MACHINES.

Report.—Wool-burring machines of rapid and effective action.

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163. First Hungarian Wool-Washing and Commission Co., Budapest, Austria.

WASHED WOOL.

Report.—Beautifully-washed wool, from which potash is extracted from the yolk by an entirely new process.

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164. David Smith & Co. (Limited), Halifax, England.

PREPARED SHODDY AND WOOL.

Report.—Commended for shoddy and wool, prepared for manufacturing purposes by a patent process, by which the burrs are completely cleaned, and for cotton and wool stuff, prepared on the same principle.

165. **The Mill Hill Wool and Rag Extracting Co. (Limited), Huddersfield, England.**

PREPARED SHODDY AND WOOL.

Report.—Commended for shoddy and wool, prepared for manufacturing purposes by a patent process, by which the burrs are completely cleaned, and for cotton and wool stuff, prepared on the same principle.

166. **Board of Agriculture of the State of New Hampshire, U. S.**

WOOL.

Report.—An assortment of Spanish merino wool of fine fibre and good staple, adapted for the manufacture of cassimeres, merinos, and flannels.

167. **State of Oregon, U. S.**

WOOL.

Report.—Some very fine specimens of merino wool of fine fibre and good staple, very much resembling Australian wool, and giving evidence that this State can produce wool of very great value.

168. **Province of Entre Rios, Argentine Republic.**

RAW WOOL.

Report.—An assortment of small samples of fine merino wool of superior quality and long staple.

169. **Danforth Locomotive and Machine Co., Paterson, N. J., U. S.**

SILK MACHINERY.

Report.—A collection of silk machinery, embracing winding and spinning frame for singles and for doubling.

170. **Government of the Argentine Republic.**

WOOLEN MANUFACTURES.

Report.—A beautiful collection of vicuña shawls and ponchos, carpets, and tapestries. Among the vicuña shawls exhibited were some especially to be mentioned, made by Jova Madueno, Samuel A. Lafone Quevedo, of Catamarca, M. Malbran, of Catamarca, and Teresa Luraschi, of Catamarca. The above goods are of the highest texture and merit.

171. **Chamber of Commerce of Reims, France.**

COLLECTIVE EXHIBIT OF WOOLEN MANUFACTURES.

Report.—A brilliant collection of merinos, cashmeres, sateens, reps, and ecosse cloth; plaid, white, and colored flannels; worsted coatings, fancy cassimeres, shawls, and blankets, all of high excellence. The finish of the merinos, and the variety and brilliancy of the colors dyed by Delamotte and Ernst Houpin, are specially commendable.

172. **Commissioners for Victoria, Melbourne, Victoria, Australia.**

RAW WOOL.

Report.—Washed lambs' wool, greasy wool, and Victoria merino; all well selected and of excellent growth and quality.

173. C. H. Beall, Brooke County, West Virginia, U. S.

WOOL.

Report.—An admirable exhibit of fleeces of American merino wool from two bucks and nine ewes, with a case containing thirty-three samples, all the samples being of exceptional excellence.

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174. S. A. Cockayne, Moundsville, Marshall County, West Virginia, U. S.

WOOL.

Report.—One fleece of good merino wool.

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175. John Ingram, Poplar Spring, Marshall County, West Virginia, U. S.

WOOL.

Report.—Ten fleeces of excellent merino combing and beautiful merino clothing wools.

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176. Ninian Beall, Ohio County, West Virginia, U. S.

WOOL.

Report.—An exhibit of Saxony fleeces, two bucks and two ewes, of fineness characteristic of the race.

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177. J. J. Surber, Vienna, Austria.

REEDS AND HEDDLES FOR LOOMS.

Report.—A good collection of reeds and heddles for looms.

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178. Faxon & Wright, Philadelphia, Pa., U. S.

EXTRACT OF WOOL.

Report.—A creditable exhibit of extract of wool, prepared by a chemical process not disclosed, together with yarn made from same, illustrating the excellence and strength of the prepared fibre.

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179. Albert Bauer, Humpoletz, Austria.

WOOLEN GOODS.

Report.—A good collection of well-made cloth, at low prices, for general use.

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180. Brosset-Heckel & Co., Lyons, France.

SATINS.

Report.—All silk, and silk and cotton back, black and colored satins.

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181. A. G. Jennings, Nottingham Lace Works, Brooklyn, N. Y., U. S.

SILK LACES.

Report.—Commended as an attractive exhibit of gimpure, cashmere, and other laces and trimmings; also for a general assortment of net goods, highly commendable for excellent fabrication. This exhibit is noticeable as illustrative of an important manufacture just introduced into the United States by the exhibitor.

182. **James Oddy & Son, Bradford, England.**

WOOLS.

Report.—A unique assortment of fleeces, admirably illustrative of the principal characteristic wools of England.

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183. **Parks & Woolson Machine Co., Springfield, Vt., U. S.**

CLOTH-SHEARING AND BRUSHING MACHINES.

Report.—A cloth-shearing and a cloth-brushing machine, both of very good construction and workmanship.

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184. **S. G. Reed, Portland, Oregon, U. S.**

LONG COMBING WOOL.

Report.—Three samples of Leicester combing wool, and three samples of Cotswold combing wool, noticeable for long staple and bright lustre.

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185. **Stanfield, Brown, & Co., England.**

SHOE LASTINGS.

Report.—A superb exhibit of ten numbers of lastings, especially creditable for richness of lustre, good color, and evenness of thread.

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186. **Jacob Senneff, Philadelphia, Pa., U. S.**

FLAT METALLIC EYE HEDDLE.

Report.—Commended as an improvement upon the cotton and varnished heddles, being less liable to abrade the warp.

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187. **The State of Michigan, U. S.**

WOOL.

Report.—A collective exhibit of samples of wool produced in the State, contributed by one hundred and sixteen persons in ten counties, four hundred and sixty-one samples being of merino wool and grades, and one hundred and ninety-six samples being of long combing wool of English blood. The collection is illustrative of the high character of an annual product of wool in the State, estimated at eight million pounds.

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188. **M. Wilkins, Eugene City, Lane County, Oregon, U. S.**

COMBING WOOL.

Report.—An exhibit of a sample of Cotswold wool, with twelve samples of wool improved by a series of crossing, pursued for many years, of high-bred Cotswold bucks on high-bred Oxfordshire-down ewes, producing a combing wool retaining the length of the original Cotswold, but with greatly increased fineness and softness, and total absence of hair.

Also for improved Oxfordshire and Leicestershire wool.

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189. **Peter Kozishnikof, Veliki-Oostioog, Vologda, Russia.**

BRISTLES.

Report.—Commended for bristles of extraordinary lengths, adapted for the manufacture of brushes.

190. **Tunxis Mills, Poquonnock, Conn., U. S.**

COLORED WORSTED YARNS.

Report.—Commended for an admirable collection of colored wools and worsted yarns, in a great variety of colors and mixtures, adapted for both dress purposes and clothing goods, and for excellence of dye and colors.

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191. **Baltic Woolen Mills, New York, N. Y., U. S.**

REPELLANTS.

Report.—Medium grades of repellants, in black and colors, of good manufacture and cheap prices.

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192. **Shaffner & Stringfellow, Philadelphia, Pa., U. S.**

GERMANTOWN WOOL.

Report.—A handsome variety of Germantown wool and zephyr yarns, in beautiful colors, and very neatly made up in a special style of ball, weighing one ounce each.

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193. **Farrington & Kinsey, Rahway, N. J., U. S.**

EXTRACT WOOLS.

Report.—Extract wools from old garments of cotton and wool, from which the cotton is destroyed by a chemical process without injury to the wool.

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194. **A. Prouvost & Co., Roubaix, France.**

WOOLS.

Report.—A large assortment of prepared wools from Australia, South America, Black Sea, Russia, France, and Belgium; also of slivers and noils from the same, adapted to a great variety of fabrics.

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195. **J. M. Kirkpatrick, Utica, N. Y., U. S.**

MERINO WOOL.

Report.—Six samples of fine merino wool, of good quality and fibre.

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196. **Albert Quigley, Cadiz, Ohio, U. S.**

MERINO WOOL.

Report.—Five samples of fine merino wool, of good quality and fibre, and adapted either for clothing or combing purposes.

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197. **E. J. Hiatt & Bros., Chester Hill, Ohio, U. S.**

OHIO WOOL.

Report.—Fleeces of excellent quality and growth of Ohio wool, well bred, and adapted for combing.

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198. **Walter Craig, Cadiz, Ohio, U. S.**

WOOL.

Report.—Seventeen samples of pure merino wool, of very superior quality, and of considerable merit.

199. **James B. Jamison, Cadiz, Ohio, U. S.**

WOOL.

Report.—Eight samples of Spanish merino wool, of very superior quality and growth.

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200. **Henry Boyles, Cadiz, Ohio, U. S.**

MERINO WOOL.

Report.—Six samples of Spanish merino wool, of very superior quality.

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201. **J. M. Holmes, Short Creek, Ohio, U. S.**

MERINO WOOL.

Report.—Twelve samples of excellent merino wool, of good staple and fibre.

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202. **W. B. Law, Connotton, Ohio, U. S.**

MERINO WOOL.

Report.—Thirteen samples of fine Spanish merino wool, of superfine quality and growth.

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203. **S. S. Campbell, Cadiz, Ohio, U. S.**

WOOL.

Report.—Twenty-four samples of merino wool, of excellent quality and good staple, well adapted for the manufacture of cashmeres and merinos.

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204. **Isaac Thomas, Short Creek, Ohio, U. S.**

WOOL.

Report.—Twelve samples of fine merino wools, of superior quality and growth.

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205. **Andrew Jamison, Short Creek, Ohio, U. S.**

MERINO WOOL.

Report.—Eleven samples of fine merino wool, of considerable merit and good fibre.

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206. **W. O. Harrah, Cadiz, Ohio, U. S.**

MERINO WOOL.

Report.—Eleven samples of pure merino wool, of superior quality and good staple.

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207. **M. L. Birney, Bowerstown, Ohio, U. S.**

WOOL.

Report.—Twelve samples of fine Spanish merino wool, of superior quality and growth.

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208. **James Torrence, Utica, N. Y., U. S.**

WOOLS.

Report.—Twelve samples of merino, Leicester, and half-blood wools, of excellent quality and considerable merit.

209. **George W. Bond, Boston, Mass., U. S.**

WOOL, MOHAIR, AND ALPACA.

Report.—A very large and complete selection of wool, mohair, and alpaca, consisting of one hundred and ninety specimens, all of distinct qualities and varieties, collected from every wool-growing country in the world, and adapted for the manufacture of all fabrics of which wool is a component part. The exhibit is admirably arranged for scientific investigation.

210. **W. W. Jamison, Cadiz, Ohio, U. S.**

MERINO WOOL.

Report.—Eleven samples of merino wool, of good quality and fibre, well adapted for combing.

211. **Thomas F. Cumming, Stony Point, Victoria, Australia.**

MERINO WOOL.

Report.—Sample of very superior combing greasy merino wool, of excellent quality and growth.

212. **J. Brock, Campania, Tasmania.**

MERINO WOOL.

Report.—Fleece of pure merino wool, of very superior quality and growth.

213. **Greenwood & Batley, Leeds, England.**

WARP-TYING MACHINE.

Report.—A warp-tying machine of very ingenious construction.

214. **George W. Keach, Chiswick, Ross, Tasmania.**

WOOL.

Report.—A fleece of four years' old ram, and one of five years' old ewe; wool of good quality and adapted for combing.

215. **David Taylor, St. Johnstone's, Tasmania.**

MERINO WOOL.

Report.—Fleeces of pure merino wool in the grease; all of superior quality and merit.

216. **Charles Headlam, Egleston, Tasmania.**

MERINO WOOL.

Report.—Fleeces of pure merino wool of excellent quality, staple, and fibre.

217. **Samuel Page, Belle Vue, New Town, Tasmania.**

MERINO WOOL.

Report.—Fleeces of pure merino hot-water washed wool; all of superior quality and excellent growth.

218. **Pacific Scouring Co., Hartford, Conn., U. S.**

WOOL.

Report.—A fine specimen of beautifully cleansed wool, carefully assorted into different qualities, ready for manufacturing purposes.

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219. **Marinska Model Farm, near Saratov, Russia.**

WOOL.

Report.—An exhibit of excellent merino clothing wool, with samples illustrative of native Russian merino fleeces.

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220. **Count Komarowsky, Government and District of Orel, Russia.**

WOOL.

Report.—Six illustrative fleeces of wool of native Russian breeds and English races.

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221. **Theodore Fatz, Olviopol, Kherson, Russia.**

WOOL.

Report.—Samples of electoral wool of great fineness and beauty.

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222. **V. Labenski, Government and District of Warsaw, Russia.**

WOOL.

Report.—Two cases of very beautiful electoral wools, short and fine in staple, corresponding to the fine Silesian and Hungarian wools.

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223. **Ganeshin Bros., Moscow, Russia.**

WOOL.

Report.—Merino wool, washed, fine, and of good staple.

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224. **Simon Stishinsky, Golobovo, near Voronesh, Russia.**

WOOL.

Report.—Merino wool of fine quality and good staple.

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225. **Nicholas Glinka, Ostrolenka, Lomza, Russia.**

WOOL.

Report.—Four fleeces of clothing wool from sheep of the electoral breed, of special fineness.

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226. **Baklanof & Sons, Moscow, Russia.**

WOOL.

Report.—Six small bales of excellent washed merino wool.

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227. **Edward Falz-Fein, Kakhovka, Tauride, Russia.**

WOOL.

Report.—Commended for seven fleeces of washed merino wool of fine quality and good growth; and for one hundred samples of clothing and combed merino wool of great excellence.

228. **P. Mariolaki, Rostov on the Don, Russia.**

WOOL.

Report.—Excellent Donskoi wool, marked for cleanness and length of staple.

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229. **A. Warshawski, St. Petersburg, Russia.**

WOOL.

Report.—Samples of wool of Rambouillet and Negretti breeds, of good growth, quality, and staple.

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230. **Karlovka Estate of the Grand Duchess Katherine Mikhailovna, Government of Poltava, Russia.**

WOOL.

Report.—One hundred samples of wool from sheep of the Rambouillet and Negretti breeds, principally adapted for combing purposes, and remarkable for length of staple.

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231. **Th. J. Martin, Verviers, Belgium.**

WOOL CARD CLOTHING.

Report.—A good exhibition of wool card clothing.

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232. **Felix Delrez, Verviers, Belgium.**

WOOL CARD CLOTHING.

Report.—An excellent exhibition of wool card clothing.

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233. **Heinr. Lewald, Breslau, Germany.**

WOOL.

Report.—A good exhibit of woolen and vigogne fabrics, made for technical and medical purposes.

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234. **Ambros. Marthaus, Oschatz, Germany.**

FELTS.

Report.—Perfectly made felts used for saddle-cloths, shoes, and boots.

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235. **R. von Mens, Karlsdorf, Silesia, Germany.**

SILESIAN WOOL.

Report.—Three very fine fleeces of Silesian wool, of excellent quality and fibre, and adapted for the manufacture of the finest cloths produced.

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236. **Valckenberg & Schoen, Worms, Germany.**

ARTIFICIAL WOOL.

Report.—A good assortment of extract, mungo, and shoddy wool.

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237. **Carlos J. Guerrero, Province of Buenos Ayres, Argentine Republic.**

MERINO WOOL.

Report.—Fleeces of unwashed merino wool, of superior quality and fibre, adapted to the manufacture of cashmeres and merinos.

238. **Nazar & Brothers, Buenos Ayres, Argentine Republic.**

MERINO WOOL.

Report.—A large assortment of samples of merino wool, in great variety of staple and of good quality.

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239. **Francisco Chas & Son, Province of Buenos Ayres, Argentine Republic.**

WOOL.

Report.—One fleece of unwashed wool, weighing thirty-one pounds, of fair quality and excellent growth.

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240. **Jorge Stegman, Province of Buenos Ayres, Argentine Republic.**

MERINO WOOL.

Report.—One fleece of healthy, full-grown merino wool, weighing twenty-one pounds, of good staple and fibre, and adapted for combing purposes.

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241. **Wilfred Latham, Province of Buenos Ayres, Argentine Republic.**

MERINO WOOL.

Report.—Two fleeces of merino combing wool, of excellent quality and fibre; also samples of fine merino wool.

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242. **Emilio Duportal, Province of Buenos Ayres, Argentine Republic.**

WOOL.

Report.—A very good exhibit of sheep-skin wool, very heavy, and of good quality, and nine inch staple; also four fleeces excellent combing wool, weighing about twenty-three pounds each.

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243. **Samuel B. Hale, Province of Buenos Ayres, Argentine Republic.**

MERINO WOOL.

Report.—Six fleeces of merino combing wool, of very superior quality, well bred, and long staple, almost equal to Australian wool, and well adapted for the manufacture of merinos and Italian cloths.

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244. **Count Alois Karolyi, Stampfen, Austria.**

WOOL.

Report.—Several very beautiful fleeces of short wool, both washed and unwashed, of exceedingly fine quality and fibre, and adapted for the manufacture of superfine cloths.

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245. **Adolf Jacob, Reichenberg, Bohemia, Austria.**

WOOLEN CLOTH.

Report.—A rich collection of military cloth, in good qualities and brilliant colors.

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246. **Count Emerich Hunyady, Urmény, Hungary, Austria.**

HUNGARIAN WOOL.

Report.—Fleeces of washed and unwashed Hungarian wool, of excellent quality and fibre, and adapted to the manufacture of fine cloths.

247. Joint Stock Company of the Vöslau Worsted Yarn Manufactory, Vöslau, Austria.

WORSTED YARNS.

Report.—An excellent collection of worsted yarns, of various numbers and brilliant colors.

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248. John L. Bowes & Brother, Liverpool, England.

WOOLS, MOHAIRS, ALPACAS, NOILS, AND WASTE.

Report.—Commended for a very complete and well-arranged assortment of wool, mohair, and alpaca, comprising about two hundred and eighty specimens, from all parts of the world; also for wool waste, extract wool, silk noils, camels'-hair noils, alpaca and mohair noils, mungo, and wool-waste, adapted for manufacturing purposes.

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249. Gunerius Pettersen, Christiania, Norway.

FLANNELS AND WOOLEN DRESS GOODS.

Report.—Well-made dress goods and flannels, for general consumption.

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250. Frederick Shaw, Redbanks, Swansea, Tasmania.

LEICESTER WOOL.

Report.—One fleece of Leicester wool, of excellent quality and growth.

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251. Wm. H. Gibson, Fairfield, Snake Banks, Tasmania.

MERINO WOOL.

Report.—For fleeces of pure merino raw wool, of superior quality and staple.

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252. John Taylor, Milford, Campbell Town, Tasmania.

MERINO WOOL.

Report.—Washed and skirted yearling merino ewe wool, of first-rate quality, adapted for the manufacture of the finest goods.

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253. W. Gibson & Son, Scone, Perth, Tasmania.

MERINO WOOL.

Report.—Fleeces of pure merino ram, ewe, and hogget wool, all of excellent quality and of the highest merit.

---

254. George Wilson, Oatlands, Tasmania.

MERINO WOOL.

Report.—Several fleeces of fine merino wool, of excellent quality, well bred, and of good staple, weighing about eleven and a half pounds each.

---

255. James Gibson, Belle Vue, Cleveland, Tasmania.

MERINO WOOL.

Report.—Fleeces of pure merino, ram, ewe, and lambs' wool, all of excellent quality and growth.

256. **W. H. D. Archer, Brickendon, Longford, Tasmania.**

WOOL.

Report.—Samples of pure merino and lambs' wool, all of excellent quality and growth.

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257. **George Taylor, Milford, Campbell Town, Tasmania.**

MERINO WOOL.

Report.—Several very superb fleeces from stud merino ram, valuable for length of fibre and adaptation for the manufacture of the best merinos and cashmeres.

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258. **William Kemp, Adelaide, South Australia, Australia.**

WOOL.

Report.—Twelve sheep-skins of excellent growth and quality; very good of their kind.

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259. **Fenwick & Scott, Queensland, Australia.**

WOOL.

Report.—A large collection of samples of Australian wool, most of which are of high merit, great length of staple, and superior quality.

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260. **G. H. Davenport, Headington Hill, Queensland, Australia.**

WOOL.

Report.—A most choice exhibit of merino combing wool of the finest quality, long staple, and excellent in every respect; especially remarkable for its length and richness of fibre.

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261. **Hayward, Armstrong, & Co., Adelaide, South Australia, Australia.**

WOOL.

Report.—A very good selection of merino, ewe, wether, hogget, and lambs' wool, all of superior quality and merit.

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262. **John Howard Angus, Adelaide, South Australia, Australia.**

WOOL.

Report.—Commended for scoured merino lambs' wool, of fine quality and in good condition; also for two cases of show wool of choice quality, and for dressed skins of pure Lincoln ram, clean and of good staple.

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263. **Shanahan & Jennings, Westbrook Station, Queensland, Australia.**

WOOL.

Report.—A very excellent exhibit of Australian merino wool, choice in every respect.

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264. **Allan McFarlane, Adelaide, South Australia, Australia.**

WOOL.

Report.—Merino ewe wool, of good fibre, staple, and quality.

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265. **Price & Browne, Adelaide, South Australia, Australia.**

WOOL.

Report.—Merino, ewe, wether, hogget, and lambs' wool, of fine quality, good fibre, and healthy growth.

266. **L. E. Lester, Rosenthal, Queensland, Australia.**

MERINO WOOL.

Report.—Australian merino wool, of superior quality and in fine condition.

---

267. **John Murray, Adelaide, South Australia, Australia.**

MERINO WOOL.

Report.—A choice selection of combing merino rams' wool, of long staple and excellent quality, some fleeces weighing fifteen pounds.

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268. **Joseph Keynes, Keyneton, South Australia, Australia.**

MERINO WOOL.

Report.—Four fleeces of combing merino wool, of healthy growth, good staple, and superior quality.

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269. **C. B. Fisher, Headington Hill, Queensland, Australia.**

MERINO WOOL.

Report.—Well-bred merino wool, of exceedingly fine quality, good staple and growth.

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270. **John Wilson, Lismore, Victoria, Australia.**

WOOL.

Report.—Three fleeces of greasy merino lambs', ewes', and wethers' wool, of good quality and growth, adapted both for combing and clothing purposes.

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271. **W. & N. G. Elder, Elder, Rookwood, Victoria, Australia.**

WOOL.

Report.—An excellen texhibit of merino lambs', ewes', and wether wool, of very superior quality and growth.

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272. **R. Goldsbrough & Co., Melbourne, Victoria, Australia.**

WOOL.

Report.—A very considerable variety of greasy and washed merino wool, most of which is of very superior quality and growth, and adapted for both clothing and combing purposes.

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273. **George Arnold & Co., Melbourne, Victoria, Australia.**

WOOL.

Report.—Five cases of wool, containing thirty fleeces of washed and greasy merino; also, Lincoln, Leicester, and cross-bred. The merinos are excellent in every respect, and the Leicester crosses are of considerable merit.

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274. **Timms Brothers, Mount Hesse, Victoria, Australia.**

WOOL.

Report.—Samples of ewe and wether merinos, hot-water washed, of very superior quality and fibre.

275. **Hastings Cunningham & Co., Melbourne, Victoria, Australia.**

WOOL.

Report.—A most complete assortment of fine washed combing merino wool; also greasy rams' wool, and cross-bred and Lincoln ewe fleeces. The merino wool is excellent in every respect, and reflects great credit on the growers.

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276. **Alexander Armstrong, Warramtine, Victoria, Australia.**

WOOL.

Report.—A very creditable exhibit of washed and greasy merino wool, of excellent quality and growth.

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277. **Wm. Bliss & Son, Chipping Norton, Oxfordshire, England.**

WOOLENS.

Report.—Commended for a very handsome assortment of Himalayan shawls, novel in pattern and combination; also, for tweeds, Cotswold suitings, serges for military wear, Cambridge rugs, Angora beavers and horse clothing; all of excellent manufacture and adapted for general use.

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278. **Howgate, Day, & Nolt, Huddersfield, England.**

WOOLENS.

Report.—A very complete assortment of reversible coatings, Victoria naps, Irish frieze, and presidents cloth; all of excellent manufacture, at low prices.

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279. **Nussey & Leachman, Leeds, England.**

CLOTH MACHINE.

Report.—A powerful hot-pressing machine for cloth, having an effective and automatic action.

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280. **B. C. Parr, Queensland, Australia.**

AUSTRALIAN WOOL.

Report.—Australian wool, of superior quality and in good condition, high class wool in every respect.

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281. **George Clark, East Talgai, Queensland, Australia.**

MERINO WOOL.

Report.—Australian merino wool, of very superior quality and fibre, and of high merit.

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282. **Gore & Co., Yandilla, Queensland, Australia.**

MERINO WOOL.

Report.—A very good exhibit of merino wool, of fine quality, good staple, and healthy growth.

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283. **Simpson & Co., Bon Acora, Queensland, Australia.**

WOOL.

Report.—Combing merino wool, of very superior quality, staple, and growth.

284. **F. R. White, Blandford, New South Wales, Australia.**

WOOL.

Report.—Commended for combing merino wool, of superior growth and quality; also for several fleeces of Saxon merino wool, of excellent growth and staple.

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285. **J. B. Bettington, Merrieva, New South Wales, Australia.**

WOOL.

Report.—Commended for two cases of Saxon merino combing wool, of fine quality, good staple and growth; also for greasy wool, of very superior quality and merit.

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286. **G. H. Cox, Mudgee, New South Wales, Australia.**

WOOL.

Report.—An extensive and excellent exhibit of Saxon merino combing wool, beautifully washed, of the finest quality, and very high merit.

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287. **Henty & Balfour, Albury, New South Wales, Australia.**

WOOL.

Report.—Two cases of combing merino wool, of very superior quality and growth, and excellent in every respect.

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288. **E. K. Cox, Mudgee, New South Wales, Australia.**

WOOL.

Report.—Several fleeces of Saxon merino combing wool, well washed, of excellent quality, fibre, and staple, and of very high merit.

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289. **E. & A. Tindal, Barrajan, New South Wales, Australia.**

WOOL.

Report.—Commended for fine washed combing Saxon merino wool, of very superior quality and fibre, and of high merit; also for greasy combing wool of superior quality.

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290. **W. S. Peter, Canterbury, New Zealand.**

WOOL.

Report.—Merino fleece wool, of very choice quality, good fibre, and staple.

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291. **Samuel Bealey, Canterbury, New Zealand.**

WOOL.

Report.—Several fleeces cross-merino ewe wool, by Romney Marsh or Kent ram, of very choice quality and good weight.

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292. **John Hall, Canterbury, New Zealand.**

WOOL.

Report.—Merino fleece wool, of very superior quality and growth.

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293. **Geo. A. Anstey, Nelson, New Zealand.**

WOOL.

Report.—Several fleeces of merino ram and ewe wool, of choice quality and excellent growth.

294. **J. Cathcart Wason, Canterbury, New Zealand.**

WOOL.

Report.—Commended for several fleeces of merino wether wool, and for Lincoln fleeces, of good staple and quality.

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295. **A. Braithwaite, Wellington, New Zealand.**

WOOL.

Report.—Romney Marsh and merino fleece wool, of good quality and growth.

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296. **A. H. Rickman, Canterbury, New Zealand.**

WOOL.

Report.—Romney Marsh ewe wool, very silky, and of healthy growth.

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297. **Charles Clark, Queensland, Australia.**

ANGORA WOOL.

Report.—Fleece of pure Angora wool, of excellent quality, good staple, and rich lustre.

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298. **Willibald Schram, Vienna, Austria.**

JACQUARD MACHINES.

Report.—Jacquard machines, excellent in workmanship.

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299. **G. L. Lethbridge, Singleton, New South Wales, Australia.**

WOOL.

Report.—Cases of Saxon merino greasy combing wool, of good fibre and quality.

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300. **A. N. Gilbert, Warwillah, New South Wales, Australia.**

WOOL.

Report.—Saxon merino combing wool, of fine quality, good staple, and healthy growth.

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301. **E. & A. Bowman, Rotherwood, New South Wales, Australia.**

WOOL.

Report.—Commended for greasy merino clothing wool, of superior quality and adapted for fine cloths; also for several cases of Saxon merino combing wool, of good quality and fibre.

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302. **T. Brown & Co., Tuppal, New South Wales, Australia.**

WOOL.

Report.—Cases of excellent combing merino wool, of first-rate quality, and, if free from burrs, would be most choice wool.

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303. **Hon. James Maclanachan, Ballochmyle, Tasmania.**

WOOL.

Report.—Fleeces of pure merino rams' wool, in the grease, of excellent growth and quality, weighing from ten to eleven pounds each.

304. **Thomas Russell, Barunah Plains, Victoria, Australia.**

WOOL.

Report.—Hot-water washed wool, of excellent quality and high merit.

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305. **W. S. Sharland, Woodbridge, New Norfolk, Tasmania.**

WOOL.

Report.—Fleeces of pure merino wool, of good quality, fibre, and staple.

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306. **John Ralston, Logan, Evandale, Tasmania.**

WOOL.

Report.—Several fleeces of pure merino wool, of good quality and growth; also Leicester fleeces of very good length, staple, and quality, highly creditable to the grower.

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307. **Victorian Woolen Cloth Co., Victoria, Australia.**

WOOLENS.

Report.—Shawls, tweeds, and broadcloths, made of pure wool, and of honest and substantial manufacture; very creditable for a new country.

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308. **Thos. Parramore, Beaufort, Ross, Tasmania.**

MERINO WOOL.

Report.—Several fleeces of wool from pure merino ram and ewes, of very superior quality and staple.

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309. **John McVean, Wooloomoonoo, New South Wales, Australia.**

MERINO WOOL.

Report.—Combing merino wool, of fine fibre and staple and very superior quality.

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310. **Geo. Synnot & Co., Geelong, Victoria, Australia.**

LINCOLN WOOL.

Report.—Samples of well-grown Lincoln wool, of good staple and rich fibre.

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311. **Andrew Loder, Colley Creek, New South Wales, Australia.**

WOOL.

Report.—Commended for an excellent exhibit of fine merino clothing wool, of superb quality, and adapted for the manufacture of the best superfine cloths; also for combing merino wool, of very choice quality, staple, and fibre.

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312. **A. H. Lowe, Dynevor, New South Wales, Australia.**

WOOL.

Report.—Angora goats' wool of fine growth and high lustre, adapted for the manufacture of mohair fabrics; capable of further improvement.

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313. **John Allen, Burrangong, New South Wales, Australia.**

WOOL.

Report.—One case of Saxon merino combing wool, of very fine quality and good staple; also well bred.

314. **Wm. Lang, Wargam, New South Wales, Australia.**

WOOL.

Report.—Excellent samples of greasy wether and hogget wool, of very superior quality and staple.

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315. **F. & A. Cox, Mudgee, New South Wales, Australia.**

WOOL.

Report.—A very superior exhibit of fine Saxon merino combing wool, excellent in quality and fibre.

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316. **D. H. Campbell, Cunningham Plains, New South Wales, Australia.**

WOOL.

Report.—Commended for one case of Rambouillet combing wool, of superior quality, healthy growth, and good staple; also for clothing wool adapted for fine cloths.

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317. **W. A. Brodribb, Moolbong, New South Wales, Australia.**

WOOL.

Report.—Fine combing merino wool, of good staple and quality, and adapted for the manufacture of cassimeres.

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318. **L. Learmonth, Groongal, New South Wales, Australia.**

WOOL.

Report.—Cases of fine combing merino wool, of excellent quality, fibre, and growth; a most choice selection.

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319. **E. B. Hulme, Burrowa, New South Wales, Australia.**

WOOL.

Report.—Saxon merino combing wool in the grease, of good fibre, quality, and growth; also very heavy fleeces.

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320. **P. G. King, Goonoo Goonoo, New South Wales, Australia.**

WOOL.

Report.—Several fleeces of superior combing merino wool, excellent in quality and staple.

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321. **Clive & Hamilton, Collaroy, New South Wales, Australia.**

WOOL.

Report.—A very superior exhibit of beautifully washed merino combing wool, of the highest quality, and excellent in every respect; also combing wool of choice quality.

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322. **Alexander Wilson, Coree, New South Wales, Australia.**

WOOL.

Report.—Fleeces of merino combing wool, of excellent growth and quality, and adapted for combing purposes; very choice in every respect.

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323. **W. Crozier, Adelaide, South Australia, Australia.**

WOOL.

Report.—Merino ewe wool of good staple, quality, and growth.

324. **Wolfenden, Shore, & Co., Cardington, Pa., U. S.**

CLOTH LOOM.

Report.—A general purpose cloth loom, of simplicity of motions and reasonable price.

325. **Samuel McCaughey, Coonong, New South Wales, Australia.**

WOOL.

Report.—One case of combing merino wool, of very superior quality and good staple; also beautifully washed.

326. **Sir Samuel Wilson, Oakleigh Hall, Victoria, Australia.**

MERINO WOOL.

Report.—Five bales of very fine merino wool, both ewes' and hoggets', remarkable for fineness of fibre and length of staple; admirably adapted for the manufacture of the finest cloths and cassimeres.

327. **Marshall & Slade, Glengallan, Queensland, Australia.**

MERINO WOOL.

Report.—A very creditable exhibit of merino wool, one fleece of which is from Champion ram. The wool is choice in every respect.

328. **C. H. Green, Goomburra, Queensland, Australia.**

MERINO WOOL.

Report.—Australian merino wool, of first-rate quality, and in excellent condition.

329. **James Kirkman, Chester, Pa., U. S.**

COTTON AND WOOL DOESKINS.

Report.—An exhibit of union doeskins (or Kentucky jeans), in a variety of mixtures, at low prices, and adapted to common use.

330. **Knox Woolen Company, Camden, Me., U. S.**

PAPER-MAKERS' FELTS.

Report.—An exhibit of paper-makers' felts, unsurpassed in excellence.

331. **Provincial Commission, Province of Buenos Ayres, Argentine Republic.**

WOOL.

Report.—Samples of merino and other wools, in different classes and great varieties; the staple in some instances being eight inches long; also sheep-skin, Cordova, and goats' wool; all of excellent growth and great weight.

332. **Portalegre Woolen Manufacturing Co., Portalegre, Portugal.**

FANCY CASSIMERES.

Report.—A collection of fancy cassimeres, in creditable qualities and good designs.

333. **Joint Exhibition of Elberfeld Manufacturers of Zanella and Coatings, Elberfeld, Germany.**

ITALIAN CLOTHS.

Report.—A splendid exhibition of Italian cloths and coatings, plain and figured, of excellent qualities, fine color, and perfect finish.

334. **Association of Cloth Makers of Reichenberg, Bohemia, Austria.**

CLOTHS, DOESKINS, AND TRICOTS.

Report.—A creditable assortment of broadcloths, doeskins, and tricots, of good quality at cheap prices.

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335. **Orange Free State, Africa.**

WOOL.

Report.—One bale of mohair and two bales of merino clothing wool; all of excellent quality.

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336. **Pryce Jones, Newtown, North Wales, Great Britain.**

FLANNELS.

Report.—A creditable exhibit of white Welsh, colored, striped, and robe flannels, together with mixed shawls of substantial make.

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337. **Carlo Ditta Morandi, Milan, Italy.**

SILK TASSELS AND FURNITURE GALLOONS.

Report.—Very well made silk tassels and furniture galloons.

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338. **Enrico Beati, Milan, Italy.**

SILK STOCKINGS.

Report.—A good variety of plain and fancy silk stockings.

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339. **The Nishijin Weavers, Kiyoto, Japan.**

BROCADED SILKS.

Report.—An excellent show of rich brocade silks, of good designs and combinations of colors.

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340. **A. L. Trapadoux, Brothers, & Co., Lyons, France.**

PRINTED FOULARDS.

Report.—A handsome collection of foulards.

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341. **A. L. Woodworth, St. John, New Brunswick.**

WOOLEN YARNS.

Report.—A considerable variety of woolen yarns, in good colors, and well adapted for the purpose intended.

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342. **Titus Calverley & Sons, Huddersfield, England.**

DOESKINS AND CASSIMERES.

Report.—Commended for economy and cost in the manufacture of black doeskins and union cassimeres, which are really creditable articles at the price.

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343. **Geo. H. Gilbert Manufacturing Co., Ware, Mass., U. S**

FLANNELS AND BLANKETS.

Report.—An imposing display of flannels and blankets, the former consisting of all wool white silk warp, gauze, moleskin, Shaker, domett, and opera flannels; the scarlet and blues of the latter especially striking; the blankets made of Ohio and West Virginia wool are noticeable for their softness of material and excellence of manufacture.

344 **Manchester Mills, Manchester, N. H., U. S.**

STUFF DRESS GOODS.

Report.—A very complete assortment of three-quarters figured dress goods—mixtures, lustres, cashmeres, twills, and six-quarters cashmeres; all of excellent manufacture, color, and finish, at reasonable prices, and adapted for general consumption.

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345. **Edward Webb & Sons, Worcester, England.**

HAIR CLOTH.

Report.—Hair cloth, adapted to upholstery and tailors' padding; the former specially notable for beauty and novelty of effects in pure white grounds, with rich dark-colored stripes in various shades; the fabric adapted to warm climates.

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346. **Robert S. Davies & Sons, Stonehouse Mills, Gloucestershire, England.**

CLOTHS, BEAVERS, MELTONS, AND DOESKINS.

Report.—A very creditable exhibit of superfine cloths, beavers, meltons, and doeskins, of excellent manufacture, color, and finish.

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347. **H. Winger, Elmira, Ontario, Canada.**

FLANNELS.

Report.—Serge flannel cotton wool blankets; excellent for the price.

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348. **Kell & Co., Bradford, England**

LASTINGS.

Report.—Lastings marked for their lustre and good texture.

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349. **Smith & Wilby, Toronto, Ontario, Canada.**

FLANNELS.

Report.—Three-quarters domestic flannels, at low cost, for general use.

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350. **Oxford Woolen Mills, Oxford, Nova Scotia.**

WOOLENS.

Report.—Wool flannels, Halifax tweeds, and home-spun stuff; all excellent goods for general use.

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351. **John Wardlaw, Galt, Ontario, Canada.**

WOOLEN YARNS.

Report.—White, colored, and gray knitting yarns, in considerable variety of shades, cheap, useful, and well adapted for general use.

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352. **Rosamond Woolen Co., Almonte, Ontario, Canada.**

WOOLENS.

Report.—Fancy cassimeres and tweeds, of excellent manufacture and low cost.

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353. **Mills & Hutchison, Montreal, Quebec, Canada.**

WOOLENS.

Report.—Three-quarters cassimeres and Canadian tweeds, of excellent manufacture and good value.

354. **Adam Lomas & Son, Sherbrooke, Quebec, Canada.**

FLANNELS.

Report.—Very cheap flannels, cloths, and tweeds, well adapted for general consumption.

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355. **Samuel T. Willett, Chambly, Quebec, Canada.**

FLANNELS.

Report.—Blue, scarlet, and mixed flannels, of rich color and soft texture, all excellent for the price.

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356. **John Harvie & Co., Hamilton, Ontario, Canada.**

WOOL.

Report.—A very complete and creditable exhibit of Leicester, Cotswold, and Southdown wool; also the following crosses: Leicester and merino, Leicester and Southdown, Cotswold and Leicester, Lincoln and Cotswold, Leicester and Cotswold. The Southdown and Leicester merino are excellent both in staple and fibre, also the Leicester and Southdown cross good; the others fair.

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357. **Toronto Tweed Co., Toronto, Ontario, Canada.**

WOOLENS.

Report.—Fancy Scotch tweeds, plaids, and cheviots, in novel patterns, and at reasonable prices.

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358. **T. S. Fisher, Toronto, Ontario, Canada.**

WOOLENS.

Report.—Cheviot coatings, meltons, tweeds, and Blair Athols, all of useful manufacture and at low prices.

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359. **Robt. Brearley & Son, Great Britain.**

PILOTS, BEAVERS, AND OVERCOATINGS.

Report.—A very creditable exhibit of pilots, beavers, and overcoatings, at moderate cost, and adapted for general consumption.

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360. **Jesse Eddy's Sons, Fall River, Mass., U. S.**

FANCY CASSIMERES.

Report.—Well-made fancy cassimeres of novel English effects, in great variety and at moderate prices.

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361. **Peckham Manufacturing Co., Providence, R. I., U. S.**

KENTUCKY JEANS, DOESKINS, AND WOOLEN YARNS.

Report.—Kentucky jeans and doeskins, smooth in finish and uniform in shade; also an excellent exhibit of woolen yarns in great variety of shades.

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362. **Groveland Mills, South Groveland, Mass., U. S.**

FLANNELS.

Report.—An assorted exhibit of red Shaker, Martha Washington, white, light red, and blue flannels, both in twenty-seven and thirty-six inch widths; all of good fabrication, at moderate cost.

363. **Oregon City Woolen Mills, Oregon, U. S.**

FANCY CASSIMERES AND BLANKETS.

Report.—Fancy cassimeres, substantial in fabric, of excellent finish, and good designs; also blankets of good quality; all marked for their cheapness, resulting from the availability of Oregon wools at low cost.

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364. **Charles N. Bacon, Winchester, Mass., U. S.**

FELTS.

Report.—An excellent exhibit of felt goods, in great variety and of good fabrication, comprising many novel and ingenious applications.

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365. **William Walshaw, Saxonville Mills, Mass., U. S.**

DYEING.

Report.—A considerable exhibit of colors, in great variety, in woolen and worsted yarns.

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366. **Meriden Woolen Co., West Meriden, Conn., U. S.**

FANCY UNION CASSIMERES.

Report.—Fancy union cassimeres of good manufacture, at cheap prices.

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367. **Union Manufacturing Co., Wolcottville, Conn., U. S.**

THREE-QUARTERS BLACK DOESKINS.

Report.—Three-quarters black doeskins; excellent in fabric, color, and finish.

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368. **Henry Fox & Co., Urbana, Ohio, U. S.**

STOCKING YARNS AND TWEEDS.

Report.—Excellent indigo-dyed stocking yarns; also tweeds, honest and substantial in material and make.

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369. **Niantic Woolen Mills, East Lyme, Conn., U. S.**

COTTON WARP TWEEDS.

Report.—Commended for a three-quarters cotton warp tweed, tastefully mixed with silk noils for "Knickerbocker" effects, at cheap prices.

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370. **Arlington Mills, Lawrence, Mass., U. S.**

ALPACAS AND BRILLIANTINES.

Report.—A very superior collection of black alpacas, brilliantines, figured mohairs, and Roubaix poplins; all first-class goods of their kind, very uniform in width, color, and finish, and, being of recent introduction, reflect great credit on the manufacturers.

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371. **Beckman & Co., Cleveland, Ohio, U. S.**

WOOL SHODDIES.

Report.—A full assortment of all wool shoddies, comprising about seventy-eight varieties of colors and mixtures, beautifully arranged, and of considerable merit.

372. **Globe Woolen Co., Utica, N. Y., U. S.**

FANCY CASSIMERES.

Report.—An admirable exhibit of fancy cassimeres, in great variety of design, superior in texture and finish; the silk-mixed, hair-lines, and velvet effects are specially noteworthy.

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373. **Weybosset Mills, Providence, R. I., U. S.**

FANCY CASSIMERES.

Report.—Three-quarters fancy cassimeres, of substantial make and tasteful designs, at moderate cost, adapted for general use.

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374. **Lippitt Woolen Co., Woonsocket, R. I., U. S.**

OVERCOATINGS AND FANCY CASSIMERES.

Report.—A good exhibit of all wool fancy elysians and fur beavers, of varied patterns and colors, in low and medium grades.

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375. **L. Dryfoos & Co., New York, N. Y., U. S.**

FELT SKIRTS.

Report.—Commended for a handsome exhibit of felt skirts, and for originality of design in embroidery.

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376. **Economy Mills, Philadelphia, Pa., U. S.**

COTTON WARP AND WOOL FUR BEAVERS.

Report.—Various grades of cotton warp and all wool fur beavers and chinchillas, of excellent designs, at cheap prices, together with cotton warp bed and horse blankets for general consumption, at very low cost.

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377. **Tillotson & Collins, Pittsfield, Mass., U. S.**

CASSIMERES.

Report.—Three-quarters cotton warp, double and twist cassimeres of low grades, noteworthy for evenness of weave and clearness of mixture, with low prices.

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378. **James Phillips, Jr., Fitchburg, Mass., U. S.**

WORSTED SUITINGS.

Report.—Worsted suitings made from Ohio wool, unsurpassed for excellence of manufacture, superiority of quality, and beauty of styles.

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379. **Camden Woolen Mills, Camden, N. J., U. S.**

COTTON WARP REPELLANTS AND FLANNELS.

Report.—Cotton warp repellants, flannels, cloakings, and knickerbocker goods at low prices.

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380. **Hinsdale Bros., Hinsdale, Mass., U. S.**

KERSEYS AND COATINGS.

Report.—Commended for light colored kerseys of good finish and beautiful and even shades, and for excellent coatings.

381. **Martin Landenberger's Sons, Philadelphia, Pa., U. S.**

DRESS GOODS AND SHAWLS.

Report.—A brilliant exhibit of fancy worsted dress goods and shawls, both knit and woven, the latter original in design and process of manufacture.

The India styles are especially creditable for novelty and tastefulness of design and moderate prices.

382. **Washington Mills, E. R. Mudge, Sawyer, & Co., Lawrence, Mass., U. S.**

WORSTED AND STUFF GOODS.

Report.—A very creditable exhibit of three-quarters worsted stuff goods, consisting of plain and twilled mixtures, checks, stripes, cretonnes, and all wool delaines; all very useful goods, and adapted for general consumption.

383. **Robert Rodman, Lafayette, R. I., U. S.**

DOESKIN JEANS.

Report.—Humboldt jeans of cotton warp and all wool filling, of substantial make and intrinsic worth, for common wear.

384. **Worumbo Manufacturing Co., Lisbon Falls, Me., U. S.**

OVERCOATINGS.

Report.—Black and colored Moscow beavers, of excellent fabric, color, and finish.

385. **Mississippi Mills, Wesson, Miss., U. S.**

WOOL FILLING JEANS.

Report.—An exhibit of doeskin jeans, of substantial manufacture, adapted to the wants of the laboring classes.

386. **Bates Manufacturing Co., Lewiston, Me., U. S.**

BEAVERS AND REPELLANTS.

Report.—Well-made beavers and repellants.

387. **Middlesex Co., Lowell, Mass., U. S.**

WOOLEN GOODS.

Report.—Commended for indigo-blue police flannels, cadet uniform and yacht cloths, with police beavers; all of substantial fabrication, and adapted for uniformed schools, city police, and for general consumption; also for large shawls, in excellent colors, at moderate prices.

388. **Midnight Yarn Co., Philadelphia, Pa., U. S.**

GERMANTOWN WOOL AND WOOLEN KNITTING YARNS.

Report.—An exhibit of woolen Germantown and knitting yarns, adapted for crochet and hand-knitting, embroidery, and hosiery, of brilliant colors and great variety of shades.

389. **Germania Mills, Holyoke, Mass., U. S.**

BEAVERS, ESKIMOS, AND DOESKINS.

Report.—Three exhibits of fur beavers, elysians, and eskimos; the Germania beavers, in blacks and colors, are especially commended for excellence of texture and finish.

390. **Hockanum Co., Rockville, Conn., U. S.**

FANCY CASSIMERES AND WORSTEDS.

Report.—A superb display of fancy cassimeres and worsted suitings, excellent in all respects.

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391. **Bel Air Manufacturing Co., Pittsfield, Mass., U. S.**

FANCY CASSIMERES.

Report.—An admirable exhibit of fancy cassimeres, of bold and novel designs, in great variety and of excellent manufacture.

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392. **Woodvale Woolen Mills, Johnstown, Pa., U. S.**

FANCY CASSIMERES.

Report.—Fancy cassimeres of medium grades, substantially made, of neat design, and at moderate prices.

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393. **Burlington Woolen Co., Winooski Falls, Vt., U. S.**

CASSIMERES AND OVERCOATINGS.

Report.—A good exhibit of elysians, black and colored Moscows, kerseys, and castors; also three-quarters black doeskins of superior finish and color.

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394. **New England Manufacturing Co., Rockville, Conn., U. S.**

WOOLEN CASSIMERES.

Report.—Fancy cassimeres of unsurpassed excellence in material, fabric, and finish; the designs tasteful, novel, and varied.

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395. **The Broad Brook Co., Broad Brook, Conn., U. S**

FANCY CASSIMERES.

Report.—An excellent exhibit of fancy cassimeres, in great variety, substantial, well made, and of good designs; also meritorious indigo-blue coatings.

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396. **C. H. & F. H. Stott, Stottsville, N. Y., U. S.**

FLANNELS.

Report.—Cotton and wool-mixed twilled flannels, for bathing-robes and other purposes; also plaid flannels of a better grade, all noticeable for cheap prices.

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397. **Steam Woolen Co., Catskill, N. Y., U. S.**

CHEVIOT SUITINGS AND SHAWLS.

Report.—A low grade of cheviot suitings and cotton and wool shawls, both specially noteworthy for cheap prices and adaptation to general consumption.

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398. **Pawtucket Hair Cloth Co., Pawtucket, R. I., U. S.**

HAIR CLOTH.

Report.—Commended for a handsome exhibit of upholstery hair cloth, varied in color and width, and noticeable for the evenness and smoothness of fabrication, especially creditable as a new industry in this country; also for originality in the application of automatic machinery to this fabrication.

399. Sawyer Woolen Mills, Dover, N. H., U. S.

FANCY CASSIMERES AND SUITINGS.

Report.—Fancy cassimeres and kerseys in blacks and colors, of high intrinsic merit, free from cotton, shoddy, or flocks; the styles neat, and the prices for the quality low; the silk mixed and the double and twist specially commended.

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400. United States Bunting Co., Lowell, Mass., U. S.

WOOLEN BUNTING, MOREENS, AND DAMASKS.

Report.—Commended for an excellent show of bunting made of English and Canadian wool, and for originality of process of striping and forming design and pattern; also for moreens and damasks of creditable manufacture and of considerable merit.

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401. Farr Alpaca Co., Holyoke, Mass., U. S.

ALPACAS AND SERGES.

Report.—An excellent exhibit of black alpacas, mohairs, cashmeres, and serges; all of superior manufacture, very regular in quality, evenly spun and woven, and of permanent color and finish.

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402. Philadelphia Worsted Spinners' Association, Philadelphia, Pa., U. S.

WORSTED YARNS.

Report.—A most complete and admirable collection of extra fine yarns, from numbers fifty to two hundred; also, colored and mixed yarns in beautiful colors and great variety, and zephyr, braid, cassimere, genappe, shawl, knitting, floss, and upholstery yarn; all very evenly spun, well adapted for the purposes intended, and excellent in every respect. Mostly spun from American wool.

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403. Hamilton Woolen Mills, Southbridge, Mass., U. S.

REPS AND DELAINES.

Report.—A very handsome and complete assortment of three-quarters printed reps and delaines, in strong patterns and designs, adapted for general consumption, and at low prices.

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404. Peacedale Manufacturing Company, Peacedale, R. I., U. S.

LASTINGS, SHAWLS, AND WORSTED SUITINGS.

Report.—An exhibit of eleven thread and other numbers of lastings, of very creditable manufacture, and well adapted for shoe purposes; also worsted suitings of excellent manufacture, and shawls in great variety. The all wool cheap shawls are especially creditable.

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405. R. Howard & Sons, Apponaug, R. I., U. S.

WOOLEN YARNS.

Report.—Woolen yarns, well spun, and of good colors.

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406. Montessuy & A. Chomer, Lyons, France.

CRAPES.

Report.—Goods perfect in manufacture, color, and finish, showing particularly great improvements in English crapes.

407. **L. Drogue & A. Monnard, Lyons, France.**

POPLINS.

Report.—A fine assortment of plain, striped, and figured poplins, of brilliant shades and good workmanship.

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408. **Ph. Dufourmantel & Co., Corbie, Somme, France.**

WOOLEN YARNS AND YARNS OF WOOL AND SILK.

Report.—Woolen and silk and woolen yarns of great perfection and wonderful fineness.

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409. **Poirrier, Mortier, & Muller, Paris, France.**

DYED GOODS.

Report.—Commended for great variety and beauty of colors in dyed cashmeres and merinos.

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410. **F. Piquee & Bros., Paris, France.**

UPHOLSTERY.

Report.—Figured and plain Utrecht velvets of excellent finish and colors.

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411. **Pinon & Guerin, Reims and Paris, France.**

WOOLEN DRESS GOODS.

Report.—Knickerbocker woolen dress goods, in great variety and of excellent designs.

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412. **G. Maes, Clichy-la-Garenne, France.**

DYED GOODS.

Report.—Commended for the vividness of color and variety of tints in dyed cashmeres and upholstery goods.

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413. **Dumortier & Guigniet, Roubaix, France.**

WORSTED SUITINGS.

Report.—Commended for variety of designs and excellence of manufacture in worsted suitings.

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414. **F. Talamon Son & Co., Paris and Elbeuf, France.**

CLOTHS.

Report.—An admirable display of fancy cassimeres and worsted suitings, excellent in design and fabrication.

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415. **Decaux Son, Elbeuf, France.**

MILITARY CLOTHS.

Report.—Well-made and serviceable military cloths of good colors.

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416. **F. Vanoutryve & Co., Roubaix, France.**

UPHOLSTERY GOODS.

Report.—Upholstery goods, reps, tapestries, and damasks, distinguished for beauty, excellence of fabrication, and variety of product.

417. **Dabert & Co., St. Denis, France.**

YARNS.

Report.—A large assortment of melanges, in great variety of hues and shades, very evenly mixed.

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418. **Braquenie Brothers, Aubusson, France.**

TAPESTRIES.

Report.—A rich collection of Gobelin tapestries, of excellent workmanship and design and of a very high artistic merit.

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419. **Pin & Cleugnet, Lyons, France.**

SHAWLS.

Report.—Shawls in India style, distinguished for beauty of design, harmony of color, and excellence of manufacture, and especially for the clearness of the whites.

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420. **Seydoux, Sieber, and Co., Paris, France.**

MERINO, CASHMERES, ROVINGS, AND YARNS.

Report.—Commended for a magnificent exhibit of French merinos, all wool and silk warp cashmeres, gauzes, and debèges; all of the highest order of merit in material, texture, beauty, and variety of hue and shade; also for a complete collection of wool rovings and yarns, illustrative of the material of which the goods are composed.

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421. **E. Bellest & Co., Elbeuf, France.**

BLACK AND COLORED CLOTHS.

Report.—A creditable exhibit of black and colored cloths of medium grades.

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422. **Chalamel & Co., Paris, France.**

DYED GOODS.

Report.—Commended for brilliant and varied tints in cashmeres and upholstery goods.

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423. **A. Guillaumet's Sons, Suresnes, France.**

DYED GOODS.

Report.—Commended for beauty, variety, and vividness of tints in merinos, poplins, and reps.

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424. **E. de Montagnon & Son, Sedan, France.**

CLOTHS.

Report.—Overcoatings and worsted suitings of novel and elegant designs and excellent quality.

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425. **Bertrand Boulla, Nîmes, France.**

TAPESTRY.

Report.—Woven tapestry in imitation of the style of the Middle Ages, of high merit and at low prices.

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426. **Robert-Guerin's Widow & Son, Reims, France.**

MERINOS, CASHMERES, AND REPS.

Report.—Merinos, cashmeres, and reps of excellent manufacture.

427. **Wanskuck Company, Providence, R. I., U. S.**

OVERCOATINGS.

Report.—A beautiful exhibit of fancy elysians and fur beavers, excellent in design and texture; their Devonshire kerseys in black and colors especially commendable.

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428. **The Rock Manufacturing Company, Rockville, Conn., U. S.**

FANCY CASSIMERES.

Report.—An unsurpassed exhibit of fancy cassimeres, in great variety of designs, without blemish in texture and finish; the hair-lines and velvets especially commendable.

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429. **Conshohocken Woolen Mills, Conshohocken, Pa., U. S.**

BEAVERS AND DOESKINS.

Report.—Moscow castor and doeskin beavers of medium grades, well made for the purposes intended, and at moderate prices; the diagonal beavers especially commendable.

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430. **J. Ledward & Son, Chester, Pa., U. S.**

COTTON AND WOOL DOESKINS.

Report.—Cotton and wool doeskins of good and substantial make and at low prices, adapted for a large demand in agricultural districts.

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431. **James Roy & Co., Watervliet Mills, West Troy, N. Y., U. S.**

SHAWLS AND WORSTED SUITINGS.

Report.—An excellent and varied display of worsted suitings and plaid shawls, the former of superior manufacture and design, and the shawls especially creditable for good taste in color and design, with cheap cost.

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432. **North Star Mills, Minneapolis, Minn., U. S.**

BLANKETS.

Report.—Commended for blankets made of Minnesota and Ohio wools, of very high excellence and beauty; also for blankets sixty-six inches by eighty-four inches, adapted for popular consumption, at low prices.

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433. **Waterloo Woolen Manufacturing Company, Waterloo, N. Y., U. S.**

SHAWLS.

Report.—Plain and fancy woolen shawls, notable for their brilliancy of colors and beauty of styles.

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434. **Mission Woolen Mills, San Francisco, Cal., U. S.**

BLANKETS.

Report.—Blankets, carriage and lap robes, made of Pacific coast wool, the higher qualities unsurpassed in excellence of fabrication, softness of finish, and tastefulness of borders.

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435. **Jacobs, Poelaert, & Co., Brussels, Belgium.**

BLANKETS.

Report.—Commended for cheapness and adaptation of blankets to general consumption.

436. **Leop. Ph. Hemmer, Aix-la-Chapelle, Germany.**

FULLING MILL.

Report.—A model of fulling mill, of excellent construction.

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437. **James Aked & Sons, Halifax, England.**

WORSTED COATINGS.

Report.—Worsted coatings of excellent manufacture and at low prices.

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438. **J. E. & G. F. Buckley, Delph, near Manchester, England.**

SHAWLS.

Report.—A small assortment of shawls in creditable styles and at very low cost.

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439. **Isaac Carr & Co., Bath, England.**

MELTONS, BEAVERS, AND OVERCOATINGS.

Report.—Meltons, beavers, and overcoatings of superior manufacture and finish, at moderate cost.

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440. **Thackray & Co., Leeds, England.**

CALF'S HAIR COATINGS.

Report.—A very handsome assortment of calf's hair coatings in beautiful shades and of excellent manufacture.

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441. **Ainley, Lord, & Co., Huddersfield, England.**

WORSTED COATINGS.

Report.—Well-made worsted coatings of good quality.

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442. **Jesse Clegg, Huddersfield, England.**

COTTON WARP FANCY CHEVIOTS.

Report.—Commended for economy in cost in the manufacture of cotton warp fancy cheviots of considerable merit, and adaptation for general use.

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443. **Liddle & Brearley, Huddersfield, England.**

WORSTED COATINGS.

Report.—A very creditable exhibit of worsted coatings, in neat designs, well manufactured, and adapted for general use.

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444. **S. Bachman, New York, N. Y., U. S.**

SHAWLS.

Report.—An excellent display of silk and worsted plaid and reversible woolen velvet shawls, of novel and beautiful designs and excellent fabrication.

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445. **F. Steffan & Co., Philadelphia, Pa., U. S.**

SHAWLS.

Report.—Reversible beaver shawls of wool filling and cotton warp, noticeable for originality and taste of design of gray and black stripes, with borders woven in the Jacquard loom.

446. **E. Gootchkof, Moscow, Russia.**

CASSIMERES, CLOTHS, AND SHAWLS.

Report.—Very creditable fancy cassimeres, black and colored cloths, and woolen shawls.

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447. **Baron Stieglitz, near Narva, Russia.**

CLOTHS AND BEAVERS.

Report.—Broadcloths, black and colored, beavers, and Moscows, of excellent qualities and finish.

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448. **Nikitin, Gorjaef, & Co., Moscow, Russia.**

DRESS GOODS AND BAREGES.

Report.—Fancy dress goods, gauzes, and bareges, of wool and silk, in elegant styles.

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449. **E. Armand & Sons, Moscow, Russia.**

ALPACAS AND LUSTRES.

Report.—Merinos, figured alpacas, black and colored lustres, in good qualities and bril liant colors.

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450. **Theodore Mikhailof & Son, Moscow, Russia.**

SERGES, REPS, AND ALPACAS.

Report.—A fair collection of fancy dress goods, serges, reps, and black and colored alpacas.

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451. **G. Kommichau, Belostok, Grodno, Russia.**

BLANKETS AND RUGS.

Report.—Woolen goods, blankets, and rugs, in creditable qualities.

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452. **Augustus Shrader, Moscow, Russia.**

LUSTRES, CASHMERES, AND PLAIDS.

Report.—A rich assortment of black and colored lustres, cashmeres, and plaids, in good qualities and colors.

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453. **Ganeshin & Co., Moscow, Russia.**

WORSTED YARNS, MOHAIRS, AND ALPACAS.

Report.—A good assortment of single and twisted worsted yarns, mohairs, and alpacas.

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454. **G. P. Uskof, Moscow, Russia.**

FANCY DRESS GOODS.

Report.—Fancy dress goods, lions, and plaids, in good qualities and designs.

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455. **Nicholas Seliverstof, Roomiantzevo, Simbirsk, Russia.**

CAMEL'S HAIR AND GOAT CLOTHS.

Report.—Cloths woven of goat and camel hair, in natural colors.

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456. **Poliakof Bros., Moscow, Russia.**

FANCY DRESS GOODS.

Report.—Very creditable fancy dress goods in good qualities and moderate prices.

457. **V. N. Soovirof, Tooshino, Moscow, Russia.**

WOOLEN CLOTHS.

Report.—Black and colored cloths of medium qualities for general use.

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458. **Shelaief Brothers, Moscow, Russia.**

SATINS.

Report.—Plain black and colored cotton-back satins of excellent manufacture.

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459. **G. J. Lecloux, Dison, Belgium.**

BROADCLOTHS.

Report.—Well-made black and blue broadcloths, adapted to the clothing trade, at cheap prices.

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460. **François Biolley & Son, Verviers, Belgium.**

BROADCLOTHS AND OVERCOATINGS.

Report.—Commended for excellence of manufacture and reasonableness of price of broadcloths and overcoatings.

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461. **Domken Bros., Verviers, Belgium.**

FANCY CASSIMERES AND WORSTED COATINGS.

Report.—Commended for cheapness, combined with utility, of fancy cassimeres and worsted coatings.

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462. **Charles Begasse, Liége, Belgium.**

FELTS.

Report.—Well-made felts at cheap prices.

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463. **Biolley Brothers & Co., Juslenville, Belgium.**

FANCY CASSIMERES AND BATISTE CLOTHS.

Report.—Commended for excellent manufacture of fancy cassimeres and batiste cloths.

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464. **Jean Tasté, Verviers, Belgium.**

FANCY CASSIMERES AND MILITARY CLOTHS.

Report.—Commended for cheapness, combined with utility, of fancy cassimeres and military cloths.

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465. **Beuthner Brothers, Berlin, Germany.**

CARD CLOTHING.

Report.—A good assortment of card clothing.

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466. **M. Chatten & Co., Dison, Belgium.**

BLACK AND COLORED CLOTHS AND BEAVERS.

Report.—Commended for good fabrication of black and blue cloths and Moscow beavers at low prices.

467. **J. J. Henrion, Dison, Belgium.**

FANCY CASSIMERES.

Report.—Commended for good fabrication of fancy cassimeres, with neat designs, and at low prices.

468. **Delhez Brothers, Dison, Belgium.**

CLOTHS.

Report.—Cloths, Moscows, and other beavers, adapted to popular consumption, at low prices.

469. **Clément Bettonville, Hodimont, Belgium.**

MOSCOW BEAVERS AND CLOTHS.

Report.—Commended for fair fabrication and cheapness of price of Moscows and other beavers.

470. **H. J. Lejeune-Vincent, Dison, Belgium.**

FANCY CASSIMERES.

Report.—Commended for novelty of design, excellence of manufacture, and adaptation to public wants, of fancy cassimeres.

471. **Peltzer & Son, Verviers, Belgium.**

CLOTHS AND DOESKINS.

Report.—Commended for excellent fabrication of broadcloths, doeskins, Moscow beavers, and chinchillas, at reasonable prices.

472. **Iwan Simonis, Verviers, Belgium.**

BROADCLOTHS, DOESKINS, AND BATISTE CLOTHS.

Report.—Commended for high excellence of manufacture of superfine black broadcloths and doeskins · excellence of batiste cloths.

473. **H. & J. Drèze, Dison, Belgium.**

MOSCOW AND OTHER OVERCOATINGS.

Report.—Commended for good fabrication of Moscows and other overcoatings, at cheap prices.

474. **L. & E. Lairitz, Remda, Germany.**

VEGETABLE WOOL.

Report.—A fine exhibit of vegetable wool and manufactures thereof; very well made in every respect.

475. **W. Spindler, Berlin, Germany.**

DYED AND PRINTED WORSTED YARNS.

Report.—A rich collection of dyed and printed worsted yarns, in brilliant colors and perfect shades.

476. **Ackens, Grand, Ry, & Co., Eupen, Germany.**

CLOTHS.

Report.—Commended for brilliancy and stability of colors, good quality, and cheapness of their woolen cloths.

477. **C. Delius, Aix-la-Chapelle, Germany.**

CLOTHS AND COATINGS.

Report.—Commended for his large production of well-made fancy coatings, at moderate prices.

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478. **Alois Knops, Aix-la-Chapelle, Germany.**

BLACK AND COLORED CLOTH.

Report.—Carefully and solidly manufactured black and colored cloths and coatings, at moderate prices.

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479. **Joh. Wilh. Jansen, Montjoie, Germany.**

FANCY CASSIMERES AND COATINGS.

Report.—Excellent fancy cassimeres and overcoatings, produced in elegant styles, fine qualities, and finish.

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480. **Wiese Brothers, Werden-on-the-Ruhr, Germany.**

CLOTH.

Report.—Cloths and overcoatings distinguished by superiority of material and excellence of manufacture and finish.

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481. **I. P. Schöller, Dühren, Germany.**

CLOTHS AND COATINGS.

Report.—Fine cloths and coatings, made of the best wools, with perfect finish.

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482. **Joh. Erken's Sons, Burtscheid, Germany.**

BLACK AND COLORED CLOTHS AND OVERCOATINGS.

Report.—Commended for fineness and finish of doeskins, and for brilliancy of colors and finish of military cloths.

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483. **L. Schöller & Sons, Dühren, Germany.**

CLOTHS AND COATINGS.

Report.—A rich assortment of cloths and worsted coatings, in the best qualities and highest finish.

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484. **Massing Brothers & Co., Püttlingen, Germany.**

BLACK SILK PLUSHES.

Report.—A remarkable assortment of hatters' black silk plushes, of great beauty in color and finish.

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485. **Paul Scholz, Friedberg, Germany.**

WOOLEN STOCKINGS.

Report.—An exhibit of woolen felted stockings, commendable for their good execution and great durability.

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486. **Seret & Turull, Barcelona, Spain.**

SHAWLS AND BLANKETS.

Report.—Shawls and blankets of good qualities.

487. **José Jordá & Son, Alcoy, Alicante, Spain.**

WOOLEN CLOTHS.

Report.—A collection of cheap fancy cassimeres.

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488. **Bresca & Co., Barcelona, Spain.**

MERINO.

Report.—Merinos and merino shawls of good qualities.

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489. **Joaquin Casanovos & Son, Sabadell, Barcelona, Spain.**

WOOLEN CLOTHS.

Report.—A good collection of fancy cassimeres, at low prices.

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490. **Maiquez & Tomás, Valencia, Spain.**

MANTLE CLOTHS.

Report.—Spanish mantles of original designs.

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491. **Juan Sallares & Son, Sabadell, Barcelona, Spain.**

WOOLEN CLOTHS.

Report.—Fancy cassimeres in creditable qualities and at moderate prices.

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492. **Rodriguez Brothers, Bejar, Salamanca, Spain.**

WOOLEN CLOTHS.

Report.—Black and colored cloths in creditable qualities, at low prices.

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493. **Tarrat & Sociats, Teruel, Spain.**

WOOLEN CLOTHS.

Report.—Colored cloths of good qualities and colors, at low prices.

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494. **Francisco Sanchez, Seville, Spain.**

GOLD BRAIDS.

Report.—A good assortment of gold braids of very creditable manufacture.

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495. **Sert Brothers & Solá, Barcelona, Spain.**

WORSTED GOODS.

Report.—A large display of dress goods, upholstering materials, shawls, blankets, carpets, and plushes, in great variety of qualities and good designs.

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496. **Bernardo Daupias & Co., Lisbon, Portugal.**

CASSIMERES, PONCHAS, AND SHAWLS.

Report.—A creditable assortment of fancy cassimeres, ponchas, and woolen shawls.

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497. **Constant Burnay, Lisbon, Portugal.**

CASSIMERES, FLANNELS, AND BLANKETS.

Report.—A very creditable exhibition of fancy cassimeres, flannels, and blankets.

498. **Antonio Alves Bibiano, Pedrogao Grande, Portugal.**

BLACK CLOTHS.

Report.—Black cloths in creditable qualities and at low prices.

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499. **Collective Exhibition of the Tilburg Wool Industry, Tilburg, Netherlands.**

BLANKETS AND FLANNELS.

Report.—A large collection of blankets, white and colored flannels, fancy cassimeres, beavers, and kerseys, in creditable qualities and at low prices.

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500. **Clinton Mills Co., Norwich, Conn., U. S**

BLANKETS.

Report.—Blankets of low grade and cheap price.

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501. **Norway Plains Co., Rochester, N. H., U. S.**

BLANKETS.

Report.—Blankets of fine and medium grade, of excellent manufacture, at moderate prices, noticeable for cleanness of stock and freedom from grease.

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502. **Campo Grande Woolen Fabrics Co., Lisbon, Portugal.**

CLOTHS AND SHAWLS.

Report.—A good assortment of black and blue cloths and shawls.

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503. **Otto von Bauer, Brünn, Moravia, Austria.**

FANCY CASSIMERES.

Report.—A very good collection of fancy cassimeres, of good finish and neat designs, at moderate prices.

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504. **Emanuel Thieben, Vienna, Austria.**

SHAWLS AND ROBES.

Report.—Well-made long shawls and morning robes, in Oriental styles.

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505. **J. Philip Schmidt & Sons, Reichenberg, Bohemia, Austria.**

BLACK AND COLORED CLOTHS.

Report.—Commended for excellent finish and material of black and blue broadcloths.

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506. **Hlawatsch & Isbary, Vienna, Austria.**

SHAWLS.

Report.—Excellent shawls of fine material and good designs in India styles.

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507. **Wilhelm Siegmund, Reichenberg, Bohemia, Austria.**

BROADCLOTHS AND DOESKINS.

Report.—Commended for high excellence and finish of superfine broadcloths and doeskins.

508. **Giov. Bozzalla & Brother, Biella, Italy.**

CASSIMERES.

Report.—A creditable exhibit of fancy cassimeres, in good designs, and at moderate prices.

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509. **Antonio Bozzalla & Brother, Coggiola, Italy.**

CASSIMERES.

Report.—A creditable exhibit of fancy cassimeres, in good designs, and at moderate prices.

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510. **Bergsbro Manufacturing Co., Norrköping, Sweden.**

CASSIMERES.

Report.—Fancy cassimeres of excellent manufacture and design.

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511. **Drag Manufacturing Co. (Limited), Norrköping, Sweden.**

FANCY CASSIMERES AND OVERCOATINGS.

Report.—Fancy cassimeres, ratiné, and other overcoatings, doeskins and tricots of superior manufacture and finish.

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512. **Malmö Wool Manufacturing Co. (Limited), Malmö, Sweden.**

CASSIMERES AND COATINGS.

Report.—Fancy cassimeres and worsted coatings, for general consumption, good for the cost of production.

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513. **Starkey Brothers, Huddersfield, England.**

BEAVERS AND DOESKINS.

Report.—Beavers, venetians, doeskins, and woaded cloths, of excellent manufacture, color, and finish.

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514. **Ballarat Woolen Co., Ballarat, Victoria, Australia.**

TWEEDS, SHAWLS, AND FLANNELS.

Report.—Tweeds, shawls, and flannels of honest and substantial manufacture, at moderate cost and good for general use.

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515. **Alexander Gray Co., Albion Woolen Mills, Geelong, Victoria, Australia.**

TWEEDS AND SHAWLS.

Report.—All wool tweeds, in a handsome assortment of shawls and patterns, and of honest and substantial manufacture.

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516. **William King, Morley, Leeds, England.**

COTTON WARP CLOTHS.

Report.—Commended for economy and cost of cotton warp cloths, of excellent make and finish.

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517. **Charles Hooper & Co., Stonehouse, Gloucestershire, England.**

CLOTHS, BEAVERS, AND DOESKINS.

Report.—An excellent assortment of black and blue superfine cloths; scarlet, crimson, and other fine military cloths of brilliant and permanent colors; kerseys of close and fine texture; Hooper's web, a specialty of the house; elysians, beavers, and doeskins; all of a high order of merit, and comprising an unusual variety for one manufactory.

518. Thomas Mallinson & Sons, Huddersfield, England.

FANCY CHEVIOTS.

Report.—A small assortment of fancy cheviots, of superior manufacture, at low prices, and adapted for general consumption.

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519. Marling & Co., Stroud, England.

CLOTHS AND BEAVERS.

Report.—An excellent assortment of superfine cloths, beavers, doeskins, and cassimeres, of superior merit and of permanent colors and finish.

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520. Samuel Salter & Co., Trowbridge, Wilts, England.

FANCY CASSIMERES.

Report.—A very handsome assortment of fancy cassimeres in novel styles, and at moderate prices.

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521. John Day & Son, Huddersfield, England.

CHEVIOT COATINGS.

Report.—Cheviot coatings, of excellent manufacture, at small cost, and adapted for general use.

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522. Joseph Buckley & Co., Delph, near Manchester, England.

COTTON AND WOOL SHAWLS.

Report.—Cotton and wool shawls, in tasteful patterns and combinations, at low cost.

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523. John Taylor & Sons, Great Britain.

WORSTED COATINGS AND SILK AND WOOL CASSIMERES.

Report.—Worsted coatings and fancy cassimeres of silk and wool, of excellent manufacture and neat patterns.

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524. Hargreave & Nusseys, Leeds, England.

WORSTED COATINGS.

Report.—Worsted coatings, medium cloths, tweeds, and meltons; all of superior quality, excellent manufacture, and at low prices.

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525. T. W. Little & Co., Leeds, England.

UNION CLOTHS.

Report.—Mixed union cloths, birds'-eye, and tweeds, at low cost, adapted for general consumption.

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526. William Child, Huddersfield, England.

MOHAIR SEALSKINS.

Report.—A very fine exhibit of mohair sealskins, tipped seal and dog skins, of exceedingly fine quality, rich material and finish; all of the highest order of merit.

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527. M. Mahony & Bros., Cork, Ireland.

BLARNEY TWEEDS.

Report.—A complete assortment of Blarney tweeds, in a great variety of colors, patterns, and qualities; all of a high order of merit, and most useful goods for general consumption.

528. **Henry Andrews & Co., Leeds, England.**

COATINGS AND COTTON WARP.

Report.—Worsted coatings, cotton warp, melton, and water-proof, of excellent manufacture, and at low cost.

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529. **J. D. Birchall & Co., Leeds, England.**

TWEEDS AND COATINGS.

Report.—A very complete assortment of light tweeds, of beautiful colors and texture; also worsted coatings, meltons, and beavers; all of superior merit, at moderate cost, and adapted for general use.

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530. **J. Vicars, Sydney, New South Wales, Australia.**

TWEEDS, PLAIDS, AND SHAWLS.

Report.—Tweeds, plaids, and shawls of honest and substantial manufacture, made of domestic wool, and very creditable for a new country.

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531. **B. Hepworth & Sons, Dewsbury, England.**

LAP ROBES AND RUGS.

Report.—Lap robes and rugs, in great variety of pattern and of excellent manufacture; also ingenuity of process of shearing rugs so as to produce an imitation of an animal's skin.

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532. **The Kanoko-shosha Co., Kiyoto, Japan.**

DYED CRAPES.

Report.—Commended for excellent production of tie and dye (Kanoko) crapes.

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533. **Custodio Lopes da Silva Guimaraes, Penafiel, Portugal.**

GOLD AND SILVER GALLOONS AND GIMP.

Report.—A good assortment and well made gold and silver galloons and gimp.

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534. **Ramires & Ramires, Lisbon, Portugal.**

COLORED SILKS, VESTINGS, AND RICH BROCATELLES.

Report.—Black and colored failles of excellent manufacture in every respect; rich brocatelles of good design and execution.

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535. **John Kemperling & Sons, Vienna, Austria.**

CIGAR AND HATTERS' RIBBONS.

Report.—Silk, and silk and cotton, cigar and hatters' ribbons, of medium grade, in a great variety of colors and designs. The goods are very effective and of good manufacture, both with regard to combination of materials and to their execution.

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536. **Usni Hadji, Brousse, Turkey.**

FELTS.

Report.—Felts of excellent quality.

537. **Joh. Schwarz & Son, Vienna, Austria.**

HATTERS' RIBBONS.

Report.—Specialty of hatters' ribbons, very clearly and neatly made; first-rate in manufacture in every respect.

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538. **Piqua Woolen Mills, F. Gray, O'Farrell & Co., Piqua, Ohio, U. S.**

PAPER-MAKERS' WET AND PRESS FELTS AND JACKETS.

Report.—A creditable exhibit of Fourdrinier print, cylinder print, wrapping, second press, and jacket felts for paper-makers' use.

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539. **Alfred Dolge, New York, N. Y., U. S.**

FELTS.

Report.—A superb exhibit of piano felt, made from Silesian wool, jewelers' and marble masons' polishing felts; all of creditable fabrication.

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540. **Collective Exhibition of Weavers from Nagahama, Province of Omi, Japan**

WHITE CRAPES.

Report.—A very fine assortment of white silk crapes, showing great clearness in color and regularity in texture, particularly those marked "Nishigori."

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541. **National Manufactory of Gobelins, Paris, France.**

GOBELINS.

Report.—Splendid specimens of Gobelin tapestry, representing this celebrated establishment.

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542. **Ministry of the Colonies, The Hague, Netherlands.**

GOLD EMBROIDERY STUFFS.

Report.—A splendid collection of silk and Oriental tissues, superb in design and perfect in workmanship; highly meritorious for the great care bestowed on this exhibit.

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543. **National Tapestry Manufactory of Beauvais, Beauvais, France.**

TAPESTRY.

Report.—Very fine specimens of artistically woven tapestry, perfect in design, combination of colors, and general execution.

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544. **The Eickmeyer Hat Blocking Machine Co., New York, N. Y., U. S.**

HAT-MAKING MACHINERY.

Report.—Ingenious, novel, and highly valuable labor-saving machinery, adapted for the making of hats, extensively used in this manufacture in place of hand processes, to wit, a hat-tip stretching machine, a universal hat pouncing machine, and hat ironing machine.

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545. **Norris & Co., London, England.**

UPHOLSTERY GOODS.

Report.—A fine display of upholstery silks, of good styles and well manufactured.

546. **Henry Noske, Philadelphia, Pa., U. S.**

PAPER-MAKERS' FELTS.

Report.—Well-made paper-makers' felts.

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547. **Novelty Weaving and Braiding Works, Tobias Kohn, Hartford, Conn., U. S.**

BRAIDS.

Report.—A very fine exhibit of braids, well made in every respect as to quality and color.

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548. **Shuler & Benninghofen, Hamilton, Ohio, U. S.**

PAPER-MAKERS' FELTS.

Report.—Well-made felts for paper-making.

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549. **W. H. Horstmann & Sons, Philadelphia, Pa., U. S.**

DRESS, CARRIAGE, AND UPHOLSTERY TRIMMINGS.

Report.—A splendid exhibit of dress, carriage, and upholstery trimmings, of great excellence and beauty in style, material, and execution; also a very handsome and complete assortment of woolen and mohair yarns, known to the trade as Germantown, cashmere, Saxonia, Shetland, and Balmoral yarns, of brilliant colors, variety of shades, and regularity of spinning.

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550. **Frezon Sr., & Leclerq, Amiens, France.**

CHEMICAL PROCESS FOR REMOVING FIBRES FROM WOOLENS.

Report.—An interesting exhibit of cloths illustrating a chemical process for removing fibres of burrs, thistles, and vegetable particles from woolen fabrics, the samples showing extraordinary efficiency in the process employed, and indicating a discovery of great practical value.

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551. **E. Roussel, Roubaix, France.**

DYED STUFFS.

Report.—A very fine collection of piece-dyed woolens, perfect in shade and finish.

---

552. **L. Dupont, Beauvais, France.**

UPHOLSTERIES AND AXMINSTER CARPETS.

Report.—Commended for excellence and originality of designs in tapestry and upholstery fabrics; also Axminster carpets of superior quality and beautiful designs.

---

553. **S. B. & M. Fleisher, Philadelphia, Pa., U. S.**

BRAIDS.

Report.—A fine exhibit of the "Star" alpaca braids, of superior manufacture, perfect in colors, and of the best materials, placing this braid in the first rank.

---

554. **William Strange & Co., Paterson, N. J., U S.**

RIBBONS.

Report.—Commended for an extremely fine exhibit of plain and fancy ribbons, of good materials, well made in every respect; also for sash and millinery ribbons of great beauty and superior quality.

555. **Enterprise Co., Woonsocket, R. I., U. S.**

SHOE LASTINGS.

Report.—A very creditable exhibit of 11, 14, and 16 thread lastings of honest make and good quality for the number of threads. The goods are well adapted for the manufacture of boots and shoes.

---

556. **Newichawanick Company, South Berwick, Me., U. S.**

HORSE BLANKETS.

Report.—An excellent exhibit of horse blankets in great variety of styles.

---

557. **Pontoosuc Woolen Manufacturing Co., Pittsfield, Mass., U. S.**

ROBES AND BLANKETS.

Report.—An excellent exhibit of lap and railway robes, all made of California wool; the Pullman palace and Wagner's blankets are particularly noteworthy.

---

558. **D. Goff & Son, Pawtucket, R. I., U. S.**

ALPACA BRAIDS.

Report.—A complete assortment of alpaca braids, in a beautiful variety of colors and mixtures, of uniform width and length, and admirably adapted for trimming ladies' dresses.

---

559. **G. L. Kelty & Co., New York, N. Y., U. S.**

TERRIES AND DAMASKS FOR UPHOLSTERY PURPOSES.

Report.—Plain, figured, and striped terries and damasks for upholsterers' use, substantially made, and of neat designs.

---

560. **John Sytof, St. Petersburg, Russia.**

GOLD DAMASKS.

Report.—Silk and velvet brocades, and velvets made of silk, silver, and gold, of great beauty in design and excellent manufacture; also trimmings of the same materials.

---

561. **Michael Borodin, Moscow, Russia.**

GAUZES.

Report.—A very fine exhibit of gauzes and fancy dress goods, in very good taste and of perfect execution.

---

562. **Mosjookhin & Sons, Moscow, Russia.**

DAMASKS AND BROCADES.

Report.—A fine display of rich furniture silk damasks of great perfection in the execution.

---

563. **Alexander Timashef, Moscow, Russia.**

GAUZES.

Report.—A large display of striped and fancy gauzes, very well made.

---

564. **Braquenie Brothers, Malines, Belgium.**

TAPESTRIES.

Report.—A rich collection of tapestries (Gobelins), of excellent workmanship, and designs of a very high artistic merit.

565. **Hauzeur-Gerard Son, Verviers, Belgium.**

YARNS.

Report.—Excellent carded yarns in great variety and brilliancy of color.

---

566. **Armand Jamme, Saint-Hadelin, Belgium.**

CARDED YARNS.

Report.—Well-spun carded yarns of great variety of colors.

---

567. **Bergmann & Co., Berlin, Germany.**

DYED ZEPHYR WOOL.

Report.—Commended for the brilliancy of colors, perfection and variety of shadings of their Berlin wools.

---

568. **Heinrich Hüffer, Crimmitschau, Germany.**

VIGOGNE YARNS.

Report.—Commended for the good assortment, large production, and cheapness of his vigogne yarns.

---

569. **Würtemberg Wool Felt Co., Giengen o. B., Germany.**

FELTS.

Report.—A rich collection of wool felts in great perfection.

---

570. **Tittel & Krüger, Leipsic, Germany.**

DYED WORSTED YARNS.

Report.—Well-dyed worsted yarns, in brilliant colors.

---

571. **Worsted Yarn Co., Kaiserslautern, Germany.**

WORSTED YARNS.

Report.—Commended for large production of fine worsted yarns for weaving purposes, in great variety of qualities, colors, and mixtures.

---

572. **Dufour & Co., Thal, Switzerland.**

SILK BOLTING-CLOTH.

Report.—Bolting-cloth of good manufacture, well adapted for the purpose.

---

573. **Sl. Siegenthaler, Enggistein, Switzerland.**

FELTS.

Report.—A good collection of felts for shoes and hats, for general use, and at moderate prices.

---

574. **Meyer Brothers, Zurich, Switzerland.**

BOLTING-CLOTH.

Report.—Bolting-cloth of great regularity and perfection of quality.

575. **Heidegger, Wegmann, & Co., Seefeld, Zurich, Switzerland.**

SILK BOLTING-CLOTH.

Report.—Bolting-cloth remarkable in all grades for superior manufacture and regularity.

576. **Egli & Sennhauser, Zurich, Switzerland.**

BOLTING-CLOTH.

Report.—Bolting-cloth in great variety; evenly and well made.

577. **Reiff-Huber, Zurich, Switzerland.**

BOLTING-CLOTH.

Report.—A large variety of bolting-cloths, deserving special merit for great perfection in their manufacture.

578. **Mehmed Erwin, Constantinople, Turkey.**

FURNITURE BROCADES.

Report.—A great display of divan figured velvets of rich design and good execution.

579. **Giorgi Melouk, Damascus, Turkey.**

GOLD FIGURED VESTMENTS.

Report.—Rich damask mantle of great beauty in material, design, and execution.

580. **F. A. Jevarjeief, St. Petersburg, Russia.**

SILVER AND GOLD FABRICS FOR CHURCH VESTMENTS.

Report.—A magnificent display of sacerdotal vestments, made of silver and gold tissues, of excellent execution, preserving the traditional splendor of the Greek Church.

581. **Gibb & Co., Philadelphia, Pa., U. S.**

CARPETS.

Report.—An exhibit of cotton-warp and rag-filling carpet of substantial manufacture, at fair prices; especially adapted for kitchen or common use.

582. **Ballard Vale Mills, Ballard Vale, Mass., U. S.**

FLANNELS.

Report.—An exhibit of all wool flannels from No. 1 to 5, including extra and double extra, all highly meritorious; the four-fourths silk warp wool filling and four-fourths silk warp gauze especially commendable for perfection of fabrication.

583. **Leedom, Shaw, & Stewart, Philadelphia, Pa., U. S.**

CARPETS.

Report.—A creditable exhibit of extra super carpets and damask Venetians, of good designs, especially noticeable for low prices.

584. **McCallum, Crease, & Sloan, Philadelphia, Pa., U. S.**

CARPETS.

Report.—An excellent exhibit of two and three ply ingrain carpets, unexceptionable in texture, design, and color, the material and fabrication indicating excellent wearing qualities.

585. **Seffarlen & Fritz, Philadelphia, Pa., U. S.**

RAG-CARPET YARNS.

Report.—An excellent exhibit of wool and cotton rag-carpet yarns, made from carpet noils, in a great variety of shades; the solferino, pink, and orange especially noteworthy.

586. **The Society of Friends of Handiwork, Stockholm, Sweden.**

CARPETS AND RUGS.

Report.—A beautiful exhibit of carpets and rugs, in the ancient traditional styles of the country of production, made by hand.

587. **Mrs. E. B. Shapleigh, Philadelphia, Pa., U. S.**

HAND-MADE RUGS.

Report.—Two rugs made of carpet yarns by the process denominated hooking, being a novel and tasteful adaptation from a domestic industry largely pursued in the State of Maine, and capable of extensive application by ladies for household decoration.

588. **P. de Andria & Co., Smyrna, Turkey.**

CARPETS.

Report.—A splendid collection of Turkish carpets, excellent in style and quality.

589. **J. G. McGee & Co., Belfast, Ireland.**

RUGS AND WRAPS.

Report.—A very handsome assortment of rugs and traveling wraps, made chiefly of mohair, silk, and wool, in imitation of real furs, otter, sealskin, and beavers; all of superior merit and beautiful combinations.

590. **John & James Dobson, Philadelphia, Pa., U. S.**

CARPETS, BLANKETS, AND OVERCOATINGS.

Report.—A varied exhibit of carpetings, all attractive in design and desirable as low and medium grades at moderate prices; also blankets, all wool fur beavers, and chinchillas, adapted for the masses.

591. **C. W. & J. Peirce, Bristol, Pa., U. S.**

FELTS, CRUMB-CLOTHS, AND FELT SKIRTS.

Report.—A capital display of felts for carpetings, skirts, and other purposes, made of all wool and cotton and wool; the fabrication substantial and excellent, the designs of the carpetings and crumb-cloths remarkable for originality and beauty.

592. **Taylor & Mullen, Newark, Del., U. S.**

CARPETS AND MATS.

Report.—A creditable exhibit of rag carpets and mats.

593. **Hartford Carpet Co., Hartford, Conn., U. S.**

CARPETS.

Report.—A capital exhibit of Brussels and two and three ply ingrain carpets, all of the best fabrication; the designs original and tasteful, and the colors clear and bright; the material and texture indicating high wearing qualities. The exhibit is illustrative of a vast production.

594. Roxbury Carpet Co., Boston, Mass., U. S.

TAPESTRY AND VELVET CARPETS.

Report.—A superior exhibit of tapestry Brussels and tapestry velvet carpets, of high excellence in texture, color, and original design; the pile conspicuous for its length, indicating good wearing qualities.

---

595. Alexander Smith & Sons Carpet Co., Yonkers, N. Y., U. S.

CARPETS.

Report.—A beautiful display of Axminster and tapestry Brussels and tapestry velvet carpets, the latter excellent in texture and design; the Axminster carpets distinguished for great beauty of design, color, and texture, and remarkable as made by original automatic machinery introduced by the senior exhibitor.

---

596. Lowell Manufacturing Co., Lowell, Mass., U. S.

CARPETS AND LASTINGS.

Report.—An imposing exhibit of Brussels, Wilton, and two and three ply ingrains, all of the best fabrication; the designs original and tasteful, and the colors clear and bright; the material and texture indicating excellent wearing qualities. The exhibit is illustrative of a vast production. Commended also for lastings.

---

597. Monitor Mills, Philadelphia, Pa., U. S.

CARPETS.

Report.—An excellent exhibit of two and three ply ingrains, specially noticeable for originality of certain patriotic designs, and of good quality and fair prices.

---

598. Bigelow Carpet Co., Clinton, Mass., U. S.

CARPETS.

Report.—A brilliant display of Brussels and Wilton carpets, in material, texture, design, and color possessing all the elements of the highest manufacture; the Wiltons especially conspicuous for chasteness of design and perfection of fabrication.

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599. John Bromley & Sons, Philadelphia, Pa., U. S.

CARPETS.

Report.—A good exhibit of super and extra-super ingrain and damask Venetian carpets, tastefully designed and unexceptionable in fabrication.

---

600. J. & H. Hutchison, Brooklyn, N. Y., U. S.

MATS.

Report.—A capital exhibit of cocoa and brush mats, with and without wool borders; excellent in design and quality, and at fair prices.

---

601. Ivins, Dietz, & Magee, Philadelphia, Pa., U. S.

CARPETS.

Report.—The only exhibit of cotton and wool and cotton ingrains, of excellent designs, at very low prices.

602. **The Read Carpet Co., Bridgeport, Conn., U. S.**

CARPETS AND CARPET TERRY.

Report.—Commended for two-ply ingrain carpets, excellent in design and finish; for originality in weaving the same with variegated yarns, increasing the number of colors; and for all wool carpet terries, serviceable and novel, adapted for libraries and offices.

---

603. **Clement Gravier, Nîmes, France.**

CARPETS.

Report.—Commended for excellence of design and execution of carpets.

---

604. **Dienelt & Eisenhardt, Philadelphia, Pa., U. S.**

GEE NON-SHUTTLE POWER CARPET LOOM.

Report.—A needle loom of ingenious construction, and a Jacquard loom for weaving silk scarfs.

---

605. **Armand Guédan & Co., Nîmes, France.**

AXMINSTER CARPETS.

Report.—Axminster carpets of finest quality and beautiful designs.

---

606. **Gevers & Schmidt, Schmiedeberg, Germany.**

SMYRNA CARPETS.

Report.—A rich assortment of imitations of Smyrna carpets of superior quality and tasteful Turkish styles.

---

607. **Gustav Schweinburg, Vienna, Austria.**

CARPETS.

Report.—A good assortment of substantial carpets for general use, at moderate prices.

---

608. **Julius Schnabel, Oravitza, Austria.**

CARPETS.

Report.—A collection of Slavonic carpets in original styles.

---

609. **Ignaz Ginzkey, Maffersdorf, Bohemia, Austria.**

BLANKETS AND CARPETS.

Report.—Blankets and carpets distinguished for taste of design, beauty of dye, and excellence of finish.

---

610. **A. G. Garjeanne & Co., Delft, Netherlands.**

CARPETS.

Report.—Imitations of Smyrna carpets, of good qualities and taste.

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611. **Jan Heukensfeldt, Delft, Netherlands.**

CARPETS.

Report.—Imitations of Smyrna carpets of good qualities.

612. Royal Carpet Manufactory, Deventer, Netherlands.

CARPETS.

Report.—A fine collection of imitations of Smyrna carpets in tasteful designs.

---

613. Said Effendi, Sivas, Turkey.

CARPETS.

Report.—Turkish carpets of beautiful designs.

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614. Edver, Diarbekir, Turkey.

CARPETS.

Report.—Turkish carpets of distinguished styles.

---

615. Tomkinson & Adam, Kidderminster, England.

CARPETS.

Report.—A fine collection of Axminster carpets in beautiful qualities and magnificent designs.

---

616. Henderson & Co., Durham, England.

AXMINSTER CARPETS.

Report.—A fine and rich assortment of Axminster carpets of admirable designs and qualities.

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617. Mehmet Oglou Alichan, Turgosklou, Turkey.

CARPETS.

Report.—Turkish carpets, very well made in every respect.

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618. Mohamet, Angora, Turkey.

CARPETS.

Report.—Commended for excellence of quality and very fine combination of colors of Turkish carpets.

---

619. John Crossley & Sons (Limited), Halifax, England.

CARPETS.

Report.—A large collection of tapestry, Brussels, velvet, and Wilton carpets, in superior qualities and at moderate prices.

---

620. John Lewis, Halifax, England.

CARPETS.

Report.—A collection of Brussels and Wilton carpets of best qualities and exquisite styles.

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621. J. & J. S. Templeton, Glasgow, Scotland.

CARPETS.

Report.—Commended for a rich variety of Wilton and Brussels carpets in admirable designs and superior qualities, and especially for patent brocade curtains, silk and wool, in the most elegant designs and combinations of colors.

622. **James Templeton & Co., Glasgow, Scotland.**

CARPETS.

Report.—A superior assortment of Axminster carpets, in exquisite styles and of best quality.

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623. **S. R. Parkhurst, Newark, N. J., U. S.**

DOUBLE-CYLINDER BURR-PICKER.

Report.—Well-constructed burring machines.

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624. **Dornan Bros. & Co., Philadelphia, Pa., U. S.**

POWER CARPET LOOM.

Report.—An ingenious needle loom in which the colored weft to be thrown is selected by a Jacquard and raised so as to bring it within the range of the reciprocating needle; this carries it half way across the shed, where it is met by a hook, which in retreating carries the bight of the weft to the other selvage, where it is knit in by a latch needle.

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625. **M. A. Furbush & Son, Philadelphia, Pa., U. S**

SET OF CARDING MACHINES.

Report.—A series of carding machines, well built, and showing several very valuable improvements; also a Murkland loom, showing simplicity, excellence of finish in work, and great production.

---

626. **James Butterworth & Son, Philadelphia, Pa., U. S.**

RAG PICKER AND RAG DUSTER.

Report.—Two machines, a rag waste and shoddy picker, and a rag duster, both of good workmanship.

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627. **Société Houget et Teston, Bède & Co., Verviers, Belgium.**

WOOL-PICKING AND CLEANING MACHINE.

Report.—Wool-picking and cleaning machine; condenser card and fulling mill; all of excellent construction.

---

628. **Thomas Stevens, Coventry, England.**

SILK LOOM AND SILK FIGURED RIBBONS.

Report.—Silk loom of excellent and quite original construction, design, and quality; result excellent and economical; new and excellent plan to lessen the pressure of the cards in the Jacquard machine. The large variety of figured and emblematical silk ribbons evinces the highest perfection.

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629. **S. H. Powers, Woodstock, New Brunswick.**

HAND LOOM.

Report.—A useful hand loom for domestic purposes.

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630. **James Smith & Co., Philadelphia, Pa., U. S.**

MACHINES AND CARD CLOTHING.

Report.—A machine for washing wool and a garnet machine or hand-waste card, both of excellent and simple construction and good workmanship; also a very creditable exhibit of card clothing.

631. **Thames River Worsted Co., Norwich, Conn., U. S.**

SPINNING FRAME.

Report.—Commended for a ring and traveler spinning frame for worsteds.

---

632. **Rodney Hunt Machine Co., Orange, Mass., U. S.**

FULLING MILL.

Report.—A useful fulling mill.

---

633. **James Short, New Brunswick, N. J., U. S.**

CARPET LOOM.

Report.—A tapestry carpet loom with an ingenious positive motion.

---

634. **George Crompton, Worcester, Mass., U. S.**

LOOMS.

Report.—The best looms for fancy weaving on shawls, cassimeres, and satinets, embracing original inventions, ingenious construction, and excellent workmanship.

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635. **B. A. Earl, Philadelphia, Pa., U. S.**

WOOL-OILING MACHINERY.

Report.—A useful wool-oiling attachment for carding machines.

---

636. **Woonsocket Machine Co., Woonsocket, R. I., U. S.**

SELF-ACTING SPINNING MILL.

Report.—A self-acting spinning mill of excellent construction and good workmanship.

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637. **John D. Cutter & Co., Paterson, N. J., U. S.**

SEWING-SILK AND SILK MACHINERY.

Report.—Black and colored sewing-silks and machine twist, excellent in every respect, and particularly distinguished for the great regularity obtained through their new system of grading the sizes. The machinery exhibited for the purpose of spooling and measuring the silk is of ingenious construction and good workmanship.

SIGNING JUDGES OF GROUP IX.

The numbers annexed to the names of the Judges indicate the reports written by them respectively.

HAYAMI KENZO, 1, 7, 45, 46, 48, 50, 55, 56, 99, 103, 104, 105, 109, 110, 111, 145.

GUSTAV GEBHARD, 2, 3, 4, 5, 8, 11, 13, 14, 17, 24, 26, 28, 30, 33, 39, 47, 49, 51, 52, 54, 58, 59, 60, 61, 62, 64, 70, 71, 74, 77, 79, 80, 81, 87, 88, 89, 90, 100, 102, 106, 107, 108, 114, 115, 122, 124, 129, 131, 133, 134, 140, 142, 146, 148, 151, 152, 153, 154, 156, 180, 337, 338, 340, 408, 458, 541, 542, 543, 547, 549, 551, 561, 574, 578, 579, 580, 588, 603, 628, 637.

JOHN G. NEESER, 6, 18, 19, 20, 22, 31, 40, 43, 44, 66, 68, 72, 91, 130, 141, 143, 155, 484, 494, 533, 534, 540.

MAX WEIGERT, 9, 10, 157, 162, 169, 170, 177, 179, 191, 213, 231, 232, 245, 279, 298, 324, 332, 342, 346, 375, 418, 436, 438, 439, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 456, 457, 459, 465, 474, 475, 485, 486, 487, 488, 489, 490, 491, 492, 493, 495, 496, 497, 498, 499, 502, 508, 509, 519, 520, 523, 525, 536, 564, 573, 584, 595, 596, 598, 604, 605, 606, 607, 608, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 625, 627, 629, 631, 632, 633, 634, 635, 636.

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AUGUST BEHMER, 34, 35, 36, 37, 38, 41, 147, 339, 532.

LOUIS CHATEL, 78, 83, 116, 118, 125, 137, 139.

CHARLES J. ELLIS, 84, 171, 178, 185, 329, 330, 343, 360, 362, 363, 365, 366, 367, 368, 369, 372, 373, 374, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 404, 409, 410, 411, 412, 416, 419, 424, 425, 426, 428, 429, 431, 433, 434, 460, 461, 462, 464, 468, 470, 472, 500, 501, 538, 539, 546, 552, 556, 557, 581, 583, 585, 590, 591, 593, 597, 599, 600, 601, 624.

HENRY MITCHELL, 158, 163, 164, 165, 166, 167, 168, 172, 190, 192, 193, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 216, 217, 218, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 246, 248, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 325, 326, 327, 328, 331, 333, 341, 344, 347, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 370, 371, 382, 400, 401, 402, 403, 437, 440, 441, 442, 443, 476, 477, 478, 479, 480, 481, 482, 483, 513, 514, 515, 516, 517, 518, 521, 522, 524, 526, 527, 528, 529, 530, 531, 555, 558, 567, 568, 569, 570, 571, 589.

JOHN L. HAYES, 159, 160, 161, 173, 174, 175, 176, 182, 187, 189, 194, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 247, 334, 335, 336, 345, 348, 361, 364, 376, 377, 378, 379, 380, 405, 413, 414, 415, 417, 420, 421, 422, 423, 427, 430, 432, 435, 463, 466, 467, 469, 471, 473, 503, 504, 505, 506, 507, 544, 548, 550, 559, 565, 566, 582, 586, 587, 592, 594, 609, 623.

THEODORE BOCHNER, JR., 183, 233, 381, 455, 626, 630.

J. D. LANG, 184, 188.

CARL ARNBERG, 249, 510, 511, 512.

EDWARD H. KNIGHT, 186.

SUPPLEMENT TO GROUP IX.

REPORTS
OF
JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.
COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

1. Sanford Mills, Sanford, Me., U. S.

LAP ROBES.

Report.—Commended for excellence in color and general finish, fitness for purpose, together with economy in cost.

2. French & Co., Norwich, England.

NORWICH CRAPE, IN SINGLE, DOUBLE, AND TREBLE.

Report.—Commended for a high degree of excellence in texture and finish.

3. Wilhelm Schrœder & Co., Zurich, Switzerland.

SILKS.

Report.—A large display of dress silks, excellent in texture and color.

4. Homberger Bros., Wetzikon, Switzerland.

SILK BOLTING-CLOTH.

Report.—Commended for uniformity in texture and fitness for purpose intended.

5. Baumann & Streuli, Horgen, Switzerland.

DRESS SILKS, CHANGEABLE COLORS.

Report.—Commended as excellent in color and texture.

6. **Jose Maria Casqueiro, Crato, Portalegre, Portugal.**

WOOLS.

Report.—Washed wools of good quality.

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7. **Devoosse-Blaise, Dison, Belgium.**

CASSIMERES.

Report.—Good fabrics, excellent in design and finish.

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8. **M. Wihl & Co., Verviers, Belgium.**

CASSIMERES.

Report.—A good display in various weights, excellent in color and designs.

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9. **Campos Mello & Co., Covilhan, Portugal.**

CASSIMERES.

Report.—Commended for fancy cassimeres of good fabrication and neat designs.

---

10. **Padronello Woolen Fabrics Co., Amarante, Portugal.**

CASSIMERES, OVERCOATINGS, AND SHAWLS.

Report.—Commended for a large display of excellent fabrics tastefully designed.

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11. **Antonio Jose Pereira da Silva e Alves, Oporto, Portugal.**

SEWING SILK.

Report.—Commended for uniform twist and superior strength.

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12. **Franzi Brothers fu Giuseppe, Alzano Maggiore, Italy.**

SILK.

Report.—A good exhibit in tram, organzine, and twist, well prepared and excellent in general finish.

---

13. **Eduardo Augusto Pereira, Meixanil, Oporto, Portugal.**

WOOLS.

Report.—An exhibit of wools, washed and in the grease, of good quality and staple.

---

14. **The Colony of the Cape of Good Hope.**

WOOLS.

Report.—A collection of samples, indiscriminately selected from bales for export, showing excellent merino and Angora wools.

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15. **T. L. Davidson, Salem, Oregon, U. S.**

MERINO WOOL.

Report.—Commended for fine staple, together with good strength.

---

16. **Fernando Ibanez Palenciano, Valencia, Spain.**

SILKS, BROCADE, AND DAMASK.

Report.—Commended for good design and workmanship of hand-made silks of old Moorish and Oriental styles.

SIGNING JUDGES OF SUPPLEMENT TO GROUP IX.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

BENJ. F. BRITTON, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15.
COLEMAN SELLERS, 16.

United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP X.

EDITED BY
FRANCIS A. WALKER,
CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1877.

Entered, according to Act of Congress, in the year 1876, by the
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SYSTEM OF AWARDS

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

* * * * * * * * * * *

Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respect ively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP X.

JUDGES.

AMERICAN.

W. H. CHANDLER, Lehigh University, South Bethlehem, Pa.

WM. O. LINTHICUM, New York City.

BENJ. F. BRITTON, New York City.

GEORGE HEWSTON, San Francisco, Cal.

E. N. HORSFORD, Cambridge, Mass.

FOREIGN.

CH. F. DIETZ-MONNIN, France.

MODEST KITTARY, Russia.

EDWARD KANITZ, Austria.

M. P. EMPEY, Canada.

GROUP X.

CLOTHING, FURS, INDIA-RUBBER GOODS, ORNAMENTS, AND FANCY ARTICLES.

(*Exclusive of Leather Boots and Shoes.*)

CLASS 250.—Ready-made clothing, knit goods and hosiery, military clothing, church vestments, costumes, water-proof clothing, and clothing for special objects.

CLASS 251.—Hats, caps, gloves, mittens, etc.; straw and palm leaf hats; bonnets, and millinery.

CLASS 252.—Laces, embroideries, and trimmings for clothing, furniture, and carriages.

CLASS 254.—Artificial flowers, coiffures, buttons, trimmings, pins, hooks-and-eyes, fans, umbrellas, sun-shades, walking-canes, pipes, and small objects of dress or adornment, exclusive of jewelry.

Toys, games, etc.

CLASS 255.—Fancy leather work,—pocket-books, toilet cases, traveling equipments, valises, and trunks. (See also in Leather, Group XII.)

CLASS 256.—Furs, manufactured into clothing, robes, etc.

CLASS 257.—Historical collections of costumes: national costumes.

CLASS 288.—Flags, insignia, emblems.

CAOUTCHOUC AND GUTTA-PERCHA INDUSTRY.

CLASS 285.—"India-rubber" goods and manufactures.

CLASS 286.—Brushes.

GENERAL REPORT

OF THE

JUDGES OF GROUP X.

INTERNATIONAL EXHIBITION, 1876.

PROF. F. A. WALKER, *Chief of Bureau of Awards:*

SIR,—I transmit to you the report of the Judges of Group X.

Respectfully yours,

W. H. CHANDLER.

GROUP X.

CLOTHING, FURS, INDIA-RUBBER GOODS, ORNAMENTS, AND FANCY ARTICLES.

RUBBER HOSE, RUBBER BELTING, AND WALRUS HIDE BELTING.

BY E. N. HORSFORD.

The American firms exhibiting rubber fire-hose were: The New York Belting & Packing Company, The National Rubber Company, The Gutta-Percha & Rubber Company, and The Star Rubber Company.

Besides these, the house of H. Schrader, of St. Petersburg, Russia, exhibited fire-hose of superior quality, but of a calibre less than the standard recognized here, so that it was impossible to submit the Russian hose to comparative test.

The Star Rubber Company's hose was not represented by an agent, and the hose was not provided with the couplings necessary for experiment.

There were, besides, several exhibitors of cotton and linen hose of various forms of manufacture: riveted, sewed, and woven whole, and lined with rubber to render them water-proof; but as this lining did not materially add to their strength, they were regarded as properly to be excluded from the class of rubber manufactures.

The experimental trials were limited to the samples submitted by The New York Belting & Packing Company, The National Rubber Company, and The Gutta-Percha & Rubber Company.

The hose tested was in each case four-ply, of two and a half inch calibre, made up of successive layers of cotton duck coated with rubber composition, constituting a tube coated and lined with rubber composition, and the whole solidified by vulcanization.

The hose of the National Rubber Company, and that of the Gutta-Percha Company, were made by winding the duck coated with com-

position upon a mandrel, with the warp of the duck parallel to the axis of the hose. That of the New York Belting & Packing Company was made by cutting the duck coated with uncured rubber composition into narrow strips, running obliquely across the warp, and then so cementing these strips and winding them upon the mandrel as to present the warp and filling at an inclination of about 45° to the axis of the hose. The latter arrangement increases the flexibility of the hose, and diminishes correspondingly the liability to injury by the abrupt bending to which hose is often subjected in practical use. At the same time it provides for an increase of capacity under pressure,—an increase of diameter with a concomitant diminution of length. With equal strength of duck such hose would have burst at a pressure inferior to that which hose with the warp parallel and the filling at right angles to the axis of the hose would require. The reason is this: with increase of the diameter of the hose under pressure the greater is the number of units of liquid exerting any given pressure, while the tenacity to be overcome in the texture of the duck and rubber wall remains a constant quantity. Assuming the increase in calibre at the instant of bursting to have been ½ inch, or from 2½ to 3, or from 100 to 125, the pressure would have been increased relatively to the strength of a given area by the quantity of one-fifth.

The strain on hose in practical service rarely reaches 225 pounds to the square inch. In this quality the three exhibits subjected to trial by hydrostatic pressure exceeded in strength any practical need.

A preliminary experiment was made with a section of the New York Belting & Packing Company's hose of but 8 feet in length. It was not weighed, and gave way under a pressure of 450 pounds.

The principal experiments were made with sections of 50 feet in length, which were first weighed. That of

The New York Belting & Packing Company weighed 66½ pounds.

The Gutta-Percha & Rubber Company weighed 67½ pounds.

The National Rubber Company weighed 59 pounds.

The New York Belting & Packing Company's hose burst at 425 pounds.

The Gutta-Percha & Rubber Company's hose burst at 435 pounds.

The National Rubber Company's hose did not burst at 500 pounds, at which pressure the couplings gave way.

The rupture of the New York Belting & Packing Company's hose presented a peculiar section, having the shape of two V's point to point >< thus; the lines following the warp and filling, and the short line uniting the apices equally inclined to the direction of the

threads of the warp and filling. This form of the rupture was regarded by experts as evidence of excellence of manufacture. Warp and filling were of equal strength.

The rupture of the Gutta-Percha & Rubber Company's hose was slightly irregular, but in the main across the filling, that is, along a line parallel to the axis of the hose. This is the direction in which rupture should take place, where the duck is wound with the warp parallel to the axis of the hose, and where the strength of the warp equals or but slightly exceeds that of the filling.

The diameter of the New York Belting & Packing Company's hose was increased about half an inch,—attended with a shortening estimated at about two per cent.

The diameter and length of the other two exhibits were not appreciably changed.

No experiments suggested themselves which might be considered the equivalents of actual wear in ordinary use. Actual practical use has shown that the warp of the duck where the fibre is parallel to the axis of the hose is subjected to greater strain in abrupt bending than the warp and filling where the thread is obliquely arranged. There is no opportunity for it to yield except by rupture.

As all the three exhibits showed a strength greatly exceeding the ordinary requirements of service, and as all were put together with skill and cured with care, it was deemed just to commend them all alike for award.

The experiments were conducted by Mr. Gardner Sanderson, detailed by Mr. John S. Albert, Chief of the Bureau of Machinery, under the direction of the Judges of Group X.

Rubber belting was on exhibition by four American companies, viz., The National Rubber Company, The New York Belting & Packing Company, The Gutta-Percha & Rubber Company, The Star Rubber Company, and also by the house of H. Schrader, of St. Petersburg, Russia. The delay in the opening of the Russian department prevented the samples of belting from coming to the attention of the Judges in time for the portion of the experimental testing made to determine the adhesion.

The manufacture of belting is simple. Cotton duck is overspread with rubber composition, and the sheets of duck so coated are piled one upon another to any desired thickness, as of two-, three-, four-, or five-ply, then under pressure subjected to a vulcanizing heat for the time necessary to accomplish proper curing.

The principal valuable qualities in a belt are:

1st. Its adhesion to the surface of the pulley.
2d. Its strength or capacity to resist strain.
3d. Its absence of the stretching quality.
4th. Its durability.

The adhesion depends upon two qualities: 1st, the smoothness of the surface of the belting, which permits contact with the smooth surface of the pulley; and, 2d, a yielding but elastic surface, which, under strain, insures a more perfect contact.

The mode of manufacture of the duck, and its incorporation into the belting with the warp parallel to the length of the belting, insure the product against stretching. The durability depends on the care observed in the curing, and in this all the samples seemed to have been cured with nice attention to temperature.

The apparatus arranged to test the adhesion was of extreme simplicity. A pulley six inches wide and fifteen and three-fourths inches exterior diameter was supported over free space. A strip of each kind of six-inch belting was in turn placed upon the pulley, and held down to the surface of the pulley by attaching to either end a weight of fifty pounds. The pulley being fixed against rotation, weights were added to one end of the strip of belting until the belt slipped upon the pulley.

The Star Rubber Company's and the New York Belting & Packing Company's six-inch belting was three-ply. Each of the others was four-ply.

The thickness of samples of belting was as follows:

Star Rubber Company's, $\frac{12}{60}$ of an inch.
New York Belting & Packing Company's, $\frac{13}{60}$ of an inch.
National Rubber Company's, $\frac{14}{60}$ of an inch.
Gutta-Percha & Rubber Company's, $\frac{17}{60}$ of an inch.

The measure of the adhesion was the weight required to overcome it. This weight was found to be, in the case of the

Gutta-Percha & Rubber Company's belting, 48¼ pounds.
The Star Rubber Company's belting, 59½ pounds.
The National Rubber Company's belting, 60¾ pounds.
New York Belting & Packing Company's belting, 70 pounds.

Taking the highest of these at 100, we have the following ratios:

New York Belting & Packing Company . .	100
National Rubber Company	86.78
Star Rubber Company	85
Gutta-Percha & Rubber Company	68.92

The strength of the belting was tested in a Riehlé's machine, under direction of Mr. Hirst, of the superintendence of Machinery Hall,

detailed by Mr. Albert; the testing-machine admitting belting of a maximum width of three inches. Three of the exhibitors had samples of this width: The National Rubber Company, The New York Belting & Packing Company, and H. Schrader, of St. Petersburg. Each was three-ply. The thickness of the National Rubber Company's exhibit was $\frac{5}{32}$ of an inch, while that of the New York Belting & Packing Company was $\frac{7}{32}$. The Russia belting was $\frac{1}{16}$ of an inch. The length of the fibre of the duck in the belting of the National Rubber Company ranged from .8 to 1½ inch, and that of the New York Belting & Packing Company from .5 to 1 inch. The duck used by the National Rubber Company was of finer quality than that in use by the New York Belting & Packing Company.

The New York Belting & Packing Company's three-inch three-ply belting, without stretching, gave way under a strain of exactly 3000 pounds. That of the National Rubber Company gave way at 3500 pounds. The Russia belting gave way at 2750 pounds.

WALRUS BELTING.

A sample of walrus belting, from Norway, manufactured by Klemm, Hanson, & Co., of Trondhjem, was tested under direction of Mr. Albert, and referred to me. Its thickness was $\frac{14}{32}$ of an inch. The adhesion was determined as that of the samples of rubber belting was, and with the same apparatus. With the flesh-side against the pulley the belt slipped at 88 pounds. With the hair or outside against the pulley the belt slipped at 38 pounds. Under the test in Riehlé's machine a three-inch strip gave way at 4175 pounds. As the thickness was more than that of the rubber belting, the strength should be rated as about one-half of the observed result of experiment.

In the judgment of the experts in the Leather Building, where opinion was sought, it was not comparable with good leather or rubber belting on account of its liability to stretch; but it was well adapted to service, on account of its porosity, for emery belting, since its porous structure would enable it to take up and hold oil and emery.

CAOUTCHOUC AND GUTTA-PERCHA.

BY W. H. CHANDLER.

The manufacture of these products has rapidly increased since Charles Goodyear's discovery of vulcanization in 1839, and in the United States especially the industry has assumed large proportions. There were very few foreign exhibitors in this line.

RUBBER-PRODUCING PLANTS.

Of rubber-producing plants, a fine exhibit was made by A. G. Day, of New York, as follows:

Ficus Brasiliensis, Brazil.
F. lucidus, "
F. macrophylla, Australia.
F. Lodrickii, "
F. Australis, "
F. elastica, East Indies.
F. rigida, "
F. nymphæfolia, East Indies.
F. religiosa, Palestine.
Euphorbia triangularis, S. Africa.
E. monstrosa, Cuba.
E. Mackaii, Java.
E. splendens, Mexico
E. punicea, "
Philodendron pertusum, or Monstera deliciosa, Brazil.
Galipia odoratissima, Brazil.
Aralia Cookii, "
Pereskii grandiflora, Mexico.

CRUDE CAOUTCHOUC.

SMYTHE, EARLE, & CO., *New York, N. Y.*

This house, brokers in india-rubber and gutta-percha, made a very interesting exhibition, including a few specimens of caoutchouc-producing plants, a complete outfit for a rubber-gatherer in Brazil, the milk of the rubber-tree, and a large variety of crude rubber in the original packages, aggregating about 6000 pounds. Among the plants were the *Ficus elastica*, from the East Indies, and the *Siphonia elastica*, from Brazil. The *Castillio elastica*, from Central America, died in transit. The seeds and milk of the rubber-tree were among the exhibits, and the outfit for a Brazilian rubber-gatherer included the baskets to carry provisions, the hatchet to tap the tree, the earthen cups to catch the milk from the taps, the gourds to collect it from the cups, the metallic pans to hold the milk, the wooden spaddle which is dipped in the milk, and the furnace and oily palm-nuts which are burnt therein, and by which the coagulated milk upon the spaddle is dried and smoked. There were also specimens of the different gums washed and sheeted in the manufactory, and a speci-

men of fine Para rubber, twenty-six years old. The following samples of crude caoutchouc were exhibited by the same firm:

From Central and South America.

Para, Brazil, coarse, original packages.
" " fine.
Ceara, " scrap.
Bahia, "
Balatta, "
Esmeralda, Equador, pressed strip.
Guayaquil, " " "
Buenaventura, United States of Colombia, pressed strip.
Carthagena, United States of Colombia, pressed strip.
Panama, pressed strip.
" slab.
Nicaragua, pressed sheets.
" scrap.
Honduras, sheet.
Mexico.

From East-Indies.

Borneo, in case.
East India, or Java, basket.
Assam, cake.
Assam, ball.
Calcutta, gutta-percha, basket.

From Africa.

West Coast, ball, cask.
" " tongue, cask.
" " niggers, bale.
" " flake.
West Coast, thimbles.
East Coast, Mozambique, ball.
" " " on sticks.
" " Madagascar, case.

THE NATIONAL RUBBER COMPANY, *Providence, R. I.*, and the INDIA-RUBBER COMB COMPANY, *New York, N. Y.*, also exhibited plants and samples of crude caoutchouc.

BRAZIL.

RAYMONDE JOSÉ RABELLO and ELIAS JOSÉ NUNEZ, *Para.*

These exhibitors displayed caoutchouc from the Provinces of Rio Grande do Norte, Amazonas, and Para. This caoutchouc is a product of the *latex* of the *Siphonia elastica*, Pers. (*Hevea guyanensis*). The exportation of caoutchouc from the province of Amazonas amounts annually to 8,800,000 pounds, nearly double the exportation of caoutchouc from the *Ficus elastica*, in the East Indies. This province also exports the "Brêo de Macaranduba" (*Minusopsetata*, considered the true gutta-percha).

COMMISSIONS OF THE PROVINCES OF CEARA AND RIO GRANDE DO NORTE.

These exhibited caoutchouc from the Mangabeira-tree (*Hancornia speciosa*), of which the Brazilian catalogue says: "This was adjudged among the best varieties at Vienna, and its cost is not over 50 cents a pound." There is also exported from this province caoutchouc from the *Jatropha elastica.*

The average annual exports of india-rubber from Brazil have been as follows:

		Value.
1839 to 1844 . . .	391,605 kilos.	210 : 000 $000 reis.
1869 to 1874 . . .	5,582,799 "	10,320 : 000 $000
Increase in 35 years . .	5,191,194 "	10,110 : 000 $000
Mean annual increase in quantity		38.98 per cent.
" " " value		141.59 "

This is mostly produced in the provinces of Para and Amazonas, where the *Siphonia elastica* abounds from the seaboard to a distance of 3300 kilometres inland. The above statistics are from the volume on Brazil, published by the Brazilian Government. They are at variance with Smythe, Earle, & Co.'s statistics.

The total exports from Para, Brazil, have been as follows:

1873	14,886,000 lbs.
1874	14,181,000 "
1875	15,369,939 "
1876	14,300,602 "

MEXICO.

An exhibit of caoutchouc was made by the State Government of Campeche. The india-rubber-tree from which the caoutchouc is extracted is the *Castilloa elastica* of the Artocarpæ family, described by Vicente Cervantes. It grows in Chiapas, Campeche, and other localities near the Gulf of Mexico, to the height of 50 to 65 feet, and can be largely propagated along the low, wet shores of the Gulf. There are more than ten species of the Ficus genus and some other plants which produce caoutchouc. The export of india-rubber in 1873 amounted to $93,052.58 in value.

Durango caoutchouc is the product of a herbaceous plant, belonging to the Synancheræ family, growing in the state of Durango. Like the genuine caoutchouc, it hardens with sulphur, and takes a beautiful polish. It was brought to the city of Mexico by Bartolomé Ballesteros, and studied by Fernando Altimarano.

VICTORIA, AUSTRALIA.

Australian rubber and rubber-stamps were exhibited by the Commissioners for Victoria.

NETHERLANDS' EAST INDIAN COLONIES.

The government exhibited india-rubber from Palembang and other districts:

Gutta-percha, balam, from Palembang.
Gutta-percha, white, from Palembang.
Gutta-percha, from Bandjermassin, Borneo.
Gutta-percha, from Boeloengan.
Gutta-gitang, from Palembang.
Gutta-soesoe, from Macassar (Celebes).
Gutta-soesoe, from Bandjermassin, Borneo.

TRINIDAD.

Galata gum, or Trinidad gutta-percha, two demijohns of sap, and six cakes, were exhibited by the Government.

VENEZUELA.

Gutta-percha from the *Mimusops globosa*, Griseb., was shown from the state of Maturin.

UNITED STATES.

G. W. MOWBRAY, *North Adams, Mass.*

An exhibit of gutta-percha, crude, also washed and ground, and wire insulated by the same, for blasting purposes.

The direct imports to New York, stated in United States currency, at four months, are said by Smythe, Earle, & Co.'s circular to be as follows:

	Para.			Central American Grades.			E. India, etc.	Total.
	Pounds.	Rates.	Fine Para.	Pounds.	Rates. Guayaquil Strip.		Pounds.	Pounds.
1872	5,183,000	68 @	87½ cents.	6,302,000	51½ @	56 cents.	378,000	11,863,000
1873	5,775,000	61 "	80 "	5,994,000	42 "	60 "	361,000	12,130,000
1874	7,955,000	75 "	58½ "	4,926,000	42 "	60 "	267,000	13,148,000
1875	5,014,000	58 "	67½ "	3,737,000	38 "	47½ "	222,000	8,973,000
1876	4,256,000	57½"	64 "	4,067,000	43 "	53 "	261,000	8,584,000

	1874.	1875.	1876.
Direct imports to New York . .	13,148,000 lbs.	8,975,000 lbs.	8,584,000 lbs.
Direct imports to Boston, E. I. grades	825,000 "	330,000 "	251,000 "
Indirect imports from England to New York and Boston	504,000 "	525,000 "	1,463,000 "
	14,477,000 "	9,830,000 "	10,298,000 "
Exports to England	550,000 "	650,000 "	825,000 "
	13,927,000 "	9,180,000 "	9,473,000 "
Add stock, January 1	1,175,000 "	1,860,000 "	940,000 "
. . .	15,102,000 "	11,040,000 "	10,413,000 "
Less stock at close of year . . .	1,860,000 "	940,000 "	510,000 "
Consumption in United States . .	13,242,000 "	10,100,000 "	9,963,000 "

INDIA-RUBBER MACHINERY.

W. E. KELLY, *New Brunswick, N. J.*

Machinery for manufacturing india-rubber, consisting of (1) corrugated rolls, with which the crude rubber is washed with cold water; (2) smooth chilled rolls for mixing the washed rubber, sulphur, and other chemicals; one of these rolls revolves three times as fast as the other; both rolls are heated internally by steam; (3) steam-heated engraved rolls for impressing the outsides of shoes; (4) three high calender rolls, heated by steam, for coating cloth with rubber, for the insides of shoes. This machinery was operated by the National Rubber Company, whose employees also finished the shoes and vulcanized them in a small steam-heated oven.

RUBBER MANUFACTURES.

Most of the rubber is consumed in the manufacture of rubber shoes, belting, hose, and packing; in addition to these uses there is a considerable industry in chirurgical instruments, household articles and clothing.

RUBBER HOSE, BELTING, AND PACKING.

The report on rubber hose, belting, and packing has been prepared by Professor E. N. Horsford, and precedes this report. The exhibitors of these articles were:

The New York Belting and Packing Company, New York, N. Y.
The Gutta-Percha and Rubber Manufacturing Company, New York, N. Y.
National Rubber Company, Providence, R. I.
The Eureka Fire Hose Company, New York, N. Y.
Wannalanset Manufacturing Company, Boston, Mass.
The Blake Hose Company, New York, N. Y.
The Columbia Car-Spring Company, New York, N. Y.
National Car-Spring Company, New York, N. Y.
Star Rubber Company, Trenton, N. J.
Russian-American Rubber Company, St. Petersburg, Russia.

BOOTS AND SHOES.

NATIONAL RUBBER COMPANY, *Providence, R. I.*

This company consumed 1,250,000 pounds of rubber in 1876. Their production from July, 1875, to July, 1876, was $2,500,000, of which about $1,400,000 was for boots and shoes, and the remainder for packing, belting, hose, druggists' articles, clothing, etc. They employ 900 hands. This company is probably the largest manu-

facturer in this country, manufacturing a large variety of goods. They make over 300 distinct varieties of shoes. Among those deserving special mention is the Monitor and snow-excluding gaiter.

THE NEW BRUNSWICK RUBBER COMPANY, *New Brunswick, N. J.*

A general assortment of neat, well-made shoes.

MOULDED HEEL STIFFENING COMPANY, *Lynn, Mass.*

A stiffener of hard rubber, sold for 3 cents per pair, of which 25,000,000 pairs have been sold since 1870.

CHADEAYNE & CHRISTIAN, *Yonkers, N. Y.*

Ventilated rubber boots.

RUSSIAN-AMERICAN INDIA-RUBBER COMPANY, *St. Petersburg, Russia.*

This company was founded in 1860. It employs 12 steam-engines of 700 horse-power and 1378 men and women. Yearly value of goods produced, 3,000,000 roubles. The exhibit included articles of dress, boots, shoes, belts, straps, chirurgical, traveling, and household articles of india-rubber, hose, and packing, a large variety of goods of excellent quality, billiard strips and telegraph insulated wire. Of boots and shoes it exhibited a good variety, with a novelty of fur-lined rubber shoes and galoshes.

CLOTHING.

THE GOSSAMER RUBBER CLOTHING COMPANY, *Boston, Mass.*

Water-proof cloaks, hats, leggings, and umbrellas, made from Scotch gingham, covered with a thin coating of rubber, sun-cured, at low prices; weight, 12 to 16 ounces. These materials afford light garments at small cost, though they probably have not the same durability as the English mackintosh.

THE NATIONAL RUBBER COMPANY, *Providence, R. I.*

A large variety of clothing, including "lustre" clothing, which is the cheapest variety; "dull finish" clothing, in all fabrics from silk to twill; reversible coats, in silk and silesia; and "flocked" clothing, covered with the shearings of broadcloth.

THE RUSSIAN-AMERICAN RUBBER COMPANY, *St. Petersburg, Russia.*

Clothing in some variety. Especially commendable was a coachman's coat of cotton check covered with rubber of a dead-white color, not equaled by any other manufacturer.

SIMON MAY & Co., *Nottingham, England.*

A large variety of elastic gorings, gussetings, and boot welts. Especially fine were those of worsted back and silk facing.

JOHN C. MCGEE, *Belfast, Ireland.*

Mackintosh coats, with silk lining and paramatta outside; also reversible coats of silk and rubber, made by twelve applications of a solution of caoutchouc. These coats were superior to all others on exhibition.

BALLY & SCHMITTER, *Aarau, Switzerland.*

Elastic boot webs of cotton, silk, and linen. The firm employs 450 hands and 140 looms.

SCHNECK & KOHNBERGER, *Vienna, Austria.*

Cotton gorings for shoes, at low prices.

LUCIEN FREMAYE & Co., *Paris, France.*

Elastic tissues.

NASHAWANNUCK MANUFACTURING COMPANY, *Easthampton, Mass.*

Elastic suspenders of good quality.

AMERICAN SUSPENDER COMPANY, *Waterbury, Conn.*,
NATIONAL SUSPENDER COMPANY, *New York, N. Y.*

Similar exhibits to the preceding.

THE EASTHAMPTON RUBBER THREAD COMPANY, *Easthampton, Mass.*

Rubber thread for use in gorings and webs. This is now cured by water, but formerly by steam, which produced a less uniform result.

THE GLENDALE ELASTIC FABRIC COMPANY, *Easthampton, Mass.*

This manufactory started in 1860, but was organized as a stock company in 1867. It employs 200 hands, and in 1876 produced 800,000 yards of cord and braids, 40,000 gross yards of fine loom webs for gaiters and pocket-books, and 10,000 gross yards of elastic belt webs. Total value, $400,000.

HOUSEHOLD GOODS.

THE DAVIDSON RUBBER COMPANY, *Boston, Mass.*

Bath-tubs, air-pillows, and beds of good design and fine finish.

THE NATIONAL RUBBER COMPANY, *Providence, R. I.*

Similar exhibits, with specialties of nursery sheeting, "flocked" piano-forte cover, inlaid checker-board, door-mats, and curry-combs.

W. B. S. TAYLOR, *New York, N. Y.*

Patent gas tubing, which is, without doubt, the best article of the kind in the market; it consists of a spiral wire core, covered with a coating of glue and glycerin, placed between two layers of rubber, and finished with a flocked or woven surface. All tubing used for conveying gas sooner or later becomes imbued with the strong smell of the gas, but this tubing is the most free from this difficulty, and, providing the gas is turned off at the chandelier only, so that the gas is not held in the tube, will remain quite free from odor.

MEDICAL AND SURGICAL GOODS.

THE DAVIDSON RUBBER COMPANY, *Boston, Mass.*

This company exhibited very largely in these branches, their goods having a fineness and beauty of finish not equaled by any other exhibitor. Among their specialties were seamless tubes, bandage gum for dentists, sun-cured sponge bags, rubber-lined, and water bags.

THE NATIONAL RUBBER COMPANY, *Providence, R. I.*

Goods in this line, of good variety and quality.

The following Parisian firms exhibited chirurgical instruments made of rubber: Jean Pierre Benas, Rondeau Bros., Vergne & Chose Bros.

MISCELLANEOUS ARTICLES.

CRANE & CO., *Newark, N. J.*

Soft-rubber bits for tender-mouthed horses.

HARD-RUBBER MANUFACTURES.

THE INDIA-RUBBER COMB COMPANY, *New York, N. Y.*

A very fine exhibit of goods, of great variety and beauty of finish, including medical and household articles, photographic and telegraphic utensils, ornamental articles, combs, etc. Deserving special mention were nine-inch tenpin balls, weighing about ten pounds each, calender rolls for paper manufacturers, and steel rolls with coating of hard rubber, five-eighths inch thick. These are not affected by acids,

and press the paper more evenly and thoroughly than those of metal, thus saving time in drying. Tube and sheet rubber of large size and fine finish, and some medallions of intricate design and fine workmanship, made by a new process, were also commendable.

G. MAGNUS & CO., *Berlin, Prussia.*

Hard-rubber billiard balls of good workmanship. These balls are sold for about one-half the price of ivory balls, but do not compete successfully with the latter. They take the force of the cue well, but do not rebound with accuracy from the cushions or from each other. Probably the metallic oxides introduced in the rubber are unevenly distributed, so that the centre of gravity does not coincide with the centre of the ball.

ANDREW ALBRIGHT, *Newark, N. J.*

Hard-rubber-coated harness.

J. DICKSON & CO., *Philadelphia, Pa.*

A patent process for engravings from hard-rubber blocks, which are cheaper and more durable than wood; 100,000 impressions have been taken from one block. The method of production is as follows: lithographic stone is covered with asphaltum, engraved, and treated with nitric acid. The mixture of rubber and sulphur is then pressed upon the stone, subjected to a vulcanizing temperature, and subsequently finished with a graver. It is said to be one-tenth the price of wood-cuts for fine work, one-half the price for coarse work, and four times as durable.

THE RUSSIAN-AMERICAN RUBBER COMPANY, *St. Petersburg, Russia.*

A cylinder cover of hard rubber outside and soft-rubber lining, of excellent make.

LOUIS VON TUXEN, *Stockholm, Sweden.*

This was an exhibit of patent leather manufactured from new and old leather, which is ground and then condensed by chemicals, and used for tarpaulins, sun-tents, floor-mats, wall-covering, machine-belts, gas- and water-pipes, machine-packing, etc. The raw materials are leather refuse, india-rubber, and chemicals. The india-rubber is dissolved in turpentine, benzine, or bisulphide of carbon. The manufactory was established in 1865, and employs 14 hands and a 4 horse-power engine.

TELEGRAPH WIRE.

AUSTIN G. DAY exhibited wire insulated with a patented mixture of caoutchouc, sulphur, oils, bituminous matters, and metallic oxides, of excellent insulating properties, durability, and very low cost. The article is termed kerite.

RUBBER MANUFACTURERS IN THE UNITED STATES.

The following list of manufacturers of caoutchouc in the United States has been compiled from various sources, and is believed to be quite complete. It does not include the manufacturers of rubber jewelry or dentists' goods:

Ætna Rubber Co.	Boston, Mass.	Clothing.
Akron Rubber Co.	Akron, Ohio	Packing, belting, and hose.
American Hard Rubber Co.		
Blake Hose Co.	Boston, Mass.	Hose.
Boston Belting Co.	Boston, Mass.	Packing, belting, hose, etc.
Boston Car-Spring Co.	Boston, Mass.	Packing and car-springs.
Boston Rubber Shoe Co.	Malden, Mass.	Shoes.
L. Candee & Co.	New Haven, Conn.	Shoes.
C. M. Clapp & Co.	Boston, Mass.	Clothing.
Cleveland Rubber Co.	Cleveland, Ohio	Packing and car-springs.
Columbia Car-Spring Co.	New York	Car springs.
The Combination Rubber Co.	New York	Packing and hose.
Davidson Rubber Co.	Charlestown, Mass.	Bands and rings and surgical goods.
A. G. Day & Bro.	Seymour, Conn.	Pencils.
C. B. Dickenson	Brooklyn, N. Y.	Bands and rings and surgical goods.
Eugene Doherty.		
Eagle Rubber Co.	Boston, Mass.	Wringer rolls.
East Hampton Thread Co.	East Hampton, Mass.	Rubber thread.
A. C. Eddy & Studley	Providence, R. I.	Syringes.
Elastic Fabric Co.	Boston, Mass.	Elastic goods, belting, and hose.
Eureka Fire Hose Co.	New York	Hose.
E. Faber & Co.	New York.	Elastic bands and rings.
Glendale Elastic Fabric Co.	East Hampton, Mass.	Elastic fabrics.
B. F. Goodrich & Co.		
Goodyear I. R. Glove Co.	Naugatuck, Conn.	Clothing and gloves.
Goodyear Metallic Rubber Shoe Co.	Naugatuck, Conn.	Shoes.
Goodyear Rubber Co.	Middletown, Conn.	Shoes.
Gossamer Rubber Clothing Co.	Boston, Mass.	Clothing.
H. A. Hall & Co.	Boston, Mass.	
Hamilton Rubber Co.	Trenton, N. J.	Packing and hose.
Hayward Rubber Co.	Colchester, Conn.	Shoes.
E. F. Heath	Newark, N. J.	Cloth.

D. Hodgman & Co.	New York	Clothing.
F. Holton	Brooklyn, N. Y.	Surgical goods.
India-Rubber Comb Co.	College Point, L. I.	Hard-rubber combs, etc.
L. Joy & Co.	Newark, N. J.	Clothing.
Keystone Rubber Co.	Williamsport, Pa.	Shoes.
Lambertville Rubber Co.	Lambertville, N. J.	Springs, packing, belting, etc.
Long Island Rubber Co.	Brooklyn, N. Y.	Shoes.
Marionville Rubber Co.		
Mercer Rubber Co.	Trenton, N. J.	Springs, packing, and hose.
Meyer Rubber Co.	New Brunswick, N. J.	Shoes.
Morrisville Rubber Co.	Morrisville, N. J.	Springs, packing, and hose.
Mystic Rubber Co.	Mystic, Conn.	Clothing.
Nashawannock Manufact'ing Co.	East Hampton, Mass.	Elastic fabrics.
National Car-Spring Co.	New York.	Car-springs.
National Rubber Co.	Bristol, R. I.	All kinds of soft-rubber goods.
Newark Rubber Co.	Newark, N. J.	
New Brunswick Rubber Co.	New Brunswick, N. J.	Shoes.
New England Car-Spring Co.	New York	Springs, packing, and hose.
New Jersey Car-Spring Co.	Jersey City, N. J.	Springs, packing, and hose.
New Jersey Rubber Co.	New Brunswick, N. J.	Shoes.
New York Belting and Packing Co.	New York	Packing, belting, hose, etc.
New York Gutta-Percha and Rubber Manufacturing Co.	New York.	Belting, packing, and hose.
New York Rubber Co.	New York	Toys, belting, and hose.
Novelty Rubber Co.	New Brunswick, N. J.	Hard-rubber canes, buttons, etc.
C. Roberts	Newark, N. J.	Elastic bands and rings.
Rubber Clothing Co.	New York.	Rubber clothing.
Rubber-Coated Harness Trimming Co.	Newark, N. J.	Rubber-coated harness trimmings.
Rubber Comb and Jewelry Co.	Bloomingdale, N. J.	Rubber combs and jewelry.
Rubber Step Manufacturing Co.	Boston, Mass.	Rubber steps.
Seamless Rubber Co.	Naugatuck, Conn.	Druggists' articles.
Star Rubber Co.	Trenton, N. J.	Packing and hose.
Stewart Rubber Co.	Rochester, N. Y.	Shoes.
Tyer Rubber Co.	Andover, Mass.	Elastic fabrics.
Union Rubber Co.	Harlem, N. Y.	Clothing.
Vulcanite Jewelry Co.	New York.	Jewelry.
Wannalauset Manufacturing Co.	Boston, Mass.	Hose.
Ward Bros. Rubber Co.		
Whitehead Bros.	Trenton, N. J.	Packing and hose.
Woonsocket Rubber Co.	Woonsocket, R. I.	Shoes.

The value of rubber goods manufactured annually in the United States is estimated at $26,000,000.

HATS AND CAPS.

BY MODEST KITTARY.

Different climates, different seasons, different ages, and different tastes determine the varieties of shapes, material, and workmanship used in the manufacture of these goods. These varieties were well represented at the International Exhibition in Philadelphia in 1876, and specially in the American department, which had the largest number of exhibitors, each having a considerable number of articles on exhibition. The total number of American exhibitors was fifteen, of whom seven were from Philadelphia, four from New York, two from Newark, one from St. Louis, and one from South Norwalk. It is to be regretted that these elegant collections were not accompanied with information on which the history of this industry in the United States could be based. While all the foreign exhibitors sent detailed descriptions stating the time their establishments had been in operation, giving the number of workmen employed, the yearly production, etc., the Official Catalogue of the American department has nothing of the kind, and the applications made by the exhibitors for examination did not give this information.

Various kinds of hats, silk or felt, could be subjected to a technical examination as well as any other article of manufacture. Such an examination was proposed to the Judges of Group X. by the writer; he proposed to determine accurately the weight, and, by pulling the hat, its strength; this, however, was not accepted by the Judges, who feared to make the examinations too difficult and complicated. It was, therefore, decided to follow the course pursued at previous International Exhibitions, leaving the mode of examination to the Judges individually. But this fails to give manufacturers those useful hints which would call their attention to points important for further improvements. The American manufacturers have reached the height of European manufacture, they are aiming to go further, and therefore such scientific examinations would be of great importance to them. The progress of this industry has been established by the fact that out of fifteen exhibitors twelve were recommended by the Judges for awards.

UNITED STATES.

E. Morris & Co., *Philadelphia, Pa.*

Their establishment was founded in 1846. They exhibited silk hats specially,—English and American styles; the first weighing 6

ounces, the latter 3¾ to 4¾ ounces. Such a light weight was not exhibited by any other firm either from the United States or any other country. Their hats made on cork and on net with shellac are very light and porous, and therefore ventilate well.

JOHN B. STETSON & CO., *Philadelphia, Pa.*

Their establishment was founded in 1864; they manufacture a high quality of felt hats, soft and stiff. Their exhibit was interesting, as showing the articles used in their manufacture,—downs, rabbits of six kinds, four kinds of hare, musk-rats, and beavers. The rabbits used are mostly French, some blue Belgian; hares from Russia, Turkey, and Saxony. Musk-rats and beavers are silver-colored and brown. The prices of these hats are moderate, up to $38 per dozen.

HAVERHILL HAT COMPANY, *Haverhill, Mass.*

A large collection of felt hats made of merino wool, of very good quality and cheap, from $7 to $15 per dozen.

DUNLAP & CO., *New York, N. Y.*

A large variety of gentlemen's and ladies' silk, felt, and straw hats. They employ 170 hands, and manufacture $400,000 worth per year.

J. S. BANCROFT & CO., *New York, N. Y.*

Light summer hats; their bamboo hats attracted attention on account of their quality and good shape.

SCHUYLER, HARTEY, & GRAHAM, *New York, N. Y.*

The best hats, caps, felt hats for masons, etc.

The following exhibitors were also commended by the Judges for the high quality of their manufacture: YATES, WARTON, & CO., *Newark, N. J.*, T. H. AMIDON'S SON, *New York, N. Y.*, ALDEN SOLMANS, *South Norwalk, Conn.*, J. H. FENTON & BROTHER, *Philadelphia, Pa.*, BLAYLOCK & CO., *Philadelphia, Pa.*, and JAMES SCHILLER & CO., *St. Louis, Mo.*

The Judges also examined the wooden blocks and other tools used in the manufacture of hats exhibited by two firms: PIERSON & HERMAN, *Newark, N. J.*, and CHRISTIAN NONNENBERGER, *Philadelphia, Pa.* Both parties were found worthy of an award, their products being equally good and complete. Mr. Nonnenberger has made an improvement in the construction of an apparatus to stretch the crown.

The stretching has been done heretofore with a wooden screw, which increased the size in one direction, leaving the other without change. Mr. Nonnenberger's apparatus increases the size of hats in two directions at the same time (lengthwise and crosswise). These two collections of blocks and tools used in the hat manufactory show distinctly the progress made in the United States. None of the other countries exhibited anything in this line. The American manufacturers have not yet succeeded in stopping the import of fine hats from England. Dunlap & Co., of New York, being heavy manufacturers, are at the same time agents for LINCOLN, BENNETT, & Co., of London; and Blaylock & Co., of Philadelphia, are agents for ORMOND DASH, of Brighton.

ENGLAND.

The Judges recommended LINCOLN, BENNETT, & Co., who had a large variety of silk, opera, felt, down, and straw hats of very high quality, but did not present any new inventions. By mistake the English Catalogue states that this firm received a medal at the Exhibition of 1851, in London, the firm having been established later. This information was given by the third English exhibitor,—TRESS & Co. They were awarded medals in London in 1852 and 1861, and in Paris in 1855 and 1867. They exhibited, beside a large collection of silk and felt hats of general character, an interesting collection of ladies' and gentlemen's Indian sun hats. These Indian hats have the shape of a helmet, have a complete ventilation, and have proved to be very practical; they are in use not only in East India, but also in the United States; are considered a good protection from sunstroke; are made of felt, are stiff, and have a good shape. The sun or tropical hats are of soft felt, with wide brims, with openings for ventilation, thin and light, and always double,—that is, one hat inside of another. In very hot weather both hats are put on; in cooler weather the second is left off; the air inclosed between the two forms the protection from the heat of the tropical sun's rays. The collection of TRESS & Co. justly received full attention from the Judges.

RUSSIA.

From Russia were eight exhibitors of hats, caps, military caps, and helmets. Russia is supplied by home production, and only a few hats are imported from Paris for admirers of French manufacture.

The following exhibitors were found worthy an award: W. TCHISTIAKOF, firm TCHOURKIN, St. Petersburg, founded eighty years ago, at present one of the largest establishments in Russia; who manufac-

tures hats of all kinds, silk, opera, felt, stiff, and soft, of good quality and at moderate prices. He suits the requirement of the majority.

LEON WILKEN, firm VANDRAGUE, Moscow, established in 1838. In quantity this house is equal to the first, and makes the same kinds, but of higher quality and prices. They were approved by the Judges for good workmanship and material.

THEOD. WEIGT, *Warsaw*, I. POPP, *Riga*, and EPHIME NAZAROF, *St. Petersburg*.

These exhibitors showed excellent workmanship on hats, and the last on "horse-guards'" helmets.

Russia does not present anything new and improved in this industry; it keeps on the same level with other countries of good manufacture, meets the requirements, and is able to keep foreign manufactures away from the home market.

AUSTRIA.

From Austria-Hungary were three exhibitors of hats; they were all found worthy of award. Data given in the Catalogue show that Austria supplies the home demand, and exports to Germany, Holland, Denmark, and America. The export to America seems to be doubtful, as no agents are named.

T. SHRIVAN & SON, *Vienna*, and PETER HABIG & CO., *Vienna*.

Hats of usual shape, of excellent workmanship. The first was established in 1848, and exhibited military hats with gold galloons and feather trimmings.

J. HÜCKELS & SON, *Neutitscheim*.

Soft and stiff down felt hats, of high quality; their soft, long-haired hats, imitating the beaver fur, were remarkable; some are dark green, blue, and of other colors. These hats are heavier than others, and are used in cold weather.

SWEDEN.

Sweden had no hat exhibit, except two caps and one helmet, exhibited by Mr. J. A. Ek, on three figures displaying officers' uniforms.

ITALY.

Outside of a large and fine collection of straw hats, which are a specialty of Italian manufacture, Italy exhibited a variety of silk hats with crowns of muslin and cork, opera hats of silk and merino, stiff

and soft felt hats. Nothing was new in these collections, but the excellence of workmanship and material deserved the approval of the Judges. There were only two exhibitors, GABRIEL RUMIERI, of Naples, and CESARE LA FARINA, of Palermo.

SPAIN.

Spain had seven exhibitors. They exhibited hats of general styles: silk hats, folding operas, down felt hats, stiff and soft. One exhibitor showed hats of natural color, and also colored Manila hats.

MATEO DE HARNA, *Zamora.*

His shop was established in 1856, and now exports to Portugal. The qualities were good and prices moderate. Special attention is to be called to the extent of this establishment; 1000 workmen are employed, as stated by the Commissioner. This number of workmen is large; if correct, this establishment is the largest in the world. The establishment of Mateo de Harna has a school for the elementary education of the workmen's children

GREGORIO SARTOC, *Seville.*

Very good and light felt hats.

FRANCISCO VILLASANTE, *Madrid.*

Good taste and low prices.

JUAN M. DE ROJAS, *Pangasinan, Philippine Islands.*

An interesting collection of Manila hats; they were light and fine, of white, brown, and black colors; the black color being artificial. Price, $10.

PORTUGAL.

From Portugal were five exhibitors, whose collections attracted the attention of the Judges.

WIDOW D'A. ROXO, *Lisbon.*

This establishment was founded in 1851; it employs 400 hands; manufactures all kinds of hats,—silk hats with muslin and with cork crowns, opera hats, stiff and soft felt hats, military hats with gold galloons. Most remarkable were the felt hats with long hair, imitation of beaver and other colors, blue, green, gray, etc. They were of the same kind as shown in the Austrian department by Hückels & Son, of Neutitscheim. It is remarkable that in Austria these hats are

worn in cold weather to keep the head warm, while in Portugal they are worn to prevent the passage of sun-rays in summer-time.

MAIA & SILVA, *Oporto.*

The same kind of hats; also those with long hair of beaver and other colors. Establishment founded in 1854; employs 350 hands; has steam-engine of 35 horse-power. The yearly production amounts to $200,000.

COSTA BRAGA & SON, *Oporto.*

Hats of general kind, silk and felt of good quality. Establishment founded in 1866; employs 200 hands; has a 15 horse-power engine; yearly production $120,000. Their felt hats are remarkable for fineness and light weight.

SANTOS & BRO., *Ovar.*

A similar exhibit of all kinds of hats, of very good quality. Established in 1872. Employs 100 hands, and has 30 horse-power.

CUSTADIO JOSE RODRIGUES BAHIA, *Brago.*

This establishment is of great importance to the country. The Commissioner from Portugal states that Portugal has a large hat-industry. It supplies the home demand, and exports to Africa and Brazil; to some extent hats are imported from Spain.

BRAZIL.

Brazil showed quite an interest in the hat exhibit; eight firms sent their collections, of which the following attracted the attention of the Judges:

IMPERIAL FLUMINENSE AGRICULTURAL INSTITUTE, *Rio de Janeiro.*

This Government establishment exhibited felt and bamboo hats of excellent workmanship. The latter are very expensive; they are valued at $60 and $70 apiece. If these goods find purchasers, it will be due to the benevolent object of the Institute.

JOAQUIM ALVARO D'ARMADO & Co., *Rio de Janeiro.*

Silk, felt, and bamboo hats of good workmanship, having variety in shapes, and moderate prices.

BIERRENBACH & BROS., *Campinac, St. Paulo.*

Silk and felt hats, soft and stiff. Their soft felt hats excelled all the soft hats in the Exhibition in fineness and light weight.

FERNANDO BRAGA and FRANCISCO FISCHER, *Rio de Janeiro.*

Good shapes, excellent workmanship.

ARGENTINE REPUBLIC.

The Argentine Republic had two exhibitors.

BUFFETI & MAYA, *Buenos Ayres.*

A high quality of silk and felt hats.

SERAFIN A. CARNEIRO, *Buenos Ayres.*

Felt hats made of vicuña downs, remarkable on account of the material, light weight, fineness, and softness.

JAPAN.

Japan had one representative.

WAKAMATSA, *Omi.*

Hats made of leaves and stalks of *Victoria Chinensis.* This material has been in use for some time in the manufacture of nice, light, and strong cases, boxes, etc. Lately this new application of the *Victoria Chinensis* has taken place. It is used in the manufacture of hats of European shapes; also bamboo hats; they are stiff, durable, and porous.

We close the general report on the collections of gentlemen's head-furnishing goods with regret that neither Germany nor France took part in this department of the Exhibition. The first has an established reputation for the moderate price and good quality of hats used by the middle classes; while the second is known for its elegance in style and high prices for hats used by the rich and aristocratic classes.

CORSETS.

BY MODEST KITTARY.

It is neither just nor right to consider corsets as an article of fancy or fashion only. The peculiarity of the form of woman has, with the civilization of the human race, made the corset a necessity; the corset gives comfort and shape to the dress of ladies, and does also other quite important services, being often a hygienic and surgical apparatus. This is the point of view the Judges of Group X. have taken.

UNITED STATES.

The United States took the largest interest in this department. They had fourteen exhibitors, each of them having some peculiar features. The appearance of the American corsets did not quite meet the views of the European ladies, especially on account of the long waists; they could but acknowledge the usefulness and importance of improvements shown by these exhibitors.

THE BOSTON COMFORT CORSET COMPANY, *Boston, Mass.*

Corsets without whalebones, these being replaced by strong cords. This change permits an easy washing of the corset. They are cheap, do not press, and are free from disadvantages due to broken or loose whalebones in corsets, after they have been worn for a length of time. These corsets are mostly large, nearly closed; they open on the side, and have small sleeves.

THE WORCESTER CORSET COMPANY, *Worcester, Mass.*

A large collection of corsets of various prices and shapes. Most remarkable is their patented arrangement of sewing the front parts of corsets, which contain the breasts. Generally these parts of the front are made, for each side, of two pieces of cloth. Between them are placed whalebones, or parts sewed through; they press the breast in the middle. The Worcester Corset Company use three pieces, and relieve hereby the nipple from pressure. These corsets have, outside of the usual back-lacing, a side-lacing. This permits a regulation of the waist of the corset. Nearly all their corsets have suspenders for skirts, hoop-petticoat, etc. Some have shoulder-braces, entirely unknown in Europe. They are due to peculiarities in form and to the narrowness of the pelvis. Two corsets deserve to be mentioned especially; one which is useful for pregnant persons, as well as for those who have falling of the womb; and the second a universal corset, which can be made to fit most any form of the body by adjustment of shoulder-straps, belt, and lacing; this being very useful for pregnant women. The corsets of the Worcester Company are not dear; they range from $7 up per dozen.

THE UNITED STATES CORSET COMPANY, *New York, N. Y.*

Woven corsets with back-lacing, remarkable for their cheapness, from $4 per dozen up.

M. COHN & CO., *New York, N. Y.*

Corsets of cheapness and good quality.

BREWSTER BROS. & CO., *Birmingham, Conn.*

A finer quality of corsets, which resemble those of Paris. They are side-laced, with shoulder-brace, ring suspenders for skirts, etc., peculiarities proper to American corsets. An open corset, made only of stiff parts, where the whalebones are placed without cloth; this is considered very good for summer-time.

MRS. HARRIET M. CHAPMAN, *Philadelphia, Pa.*

This firm exhibited buff corsets; they are high, and cover the breasts; the front is made in the shape of two buffs (pad), to receive the breasts. These corsets are very useful to persons who have sore breasts, and give at the same time a nice appearance to those who have small-developed breasts.

GEORGE FROST & CO., *Boston, Mass.*

Most remarkable is the corset of this firm, called "Emancipation corset," recommended for young women. The corset reaches only the breasts, relieves them from any pressure, and does not prevent their free development.

PALMER & WILLIAMS, *Boston, Mass.*

Corsets with double busk. In addition to the two busks generally applied, a third wide one is placed under them. In case one of the two break, the breasts cannot be hurt, and it is not required to repair the corset at once.

MME. DEMOREST, *New York, N. Y.*

In addition to a large display of ladies' dress patterns, this exhibit comprised a large collection of corsets, ladies' shoulder-braces, skirt and stocking suspenders. These suspenders, also made independent of the corsets, are considered as very useful.

FRANCE.

FOREY & OPPENHEIM, *Paris.*

Corsets, especially made for the Exhibition, with silk, silver, and gold embroidery; very tasteful work, for which the firm was found worthy of an award.

P. LENOIR, *Paris.*

Excellent corsets. They have an interesting peculiarity, having the busk and bones substituted by rubber.

GERMANY.

CROSS & CO., *Baden*,
G. M. OTTENHEIMER & SON, *Stuttgard*.

These corsets do not show anything new, but are considered worthy of an award for good workmanship, shape, and cheapness.

SPAIN.

J. CARDONA & BALDRICH, *Barcelona*.

In their large exhibit the woven corsets were equal to the American in price and quality. More interesting was their exhibit of open corsets, cheaper, light, and well adapted to the climate in Spain. Messrs. Cardona & Baldrich also exhibited some hygienic and surgical corsets for deformed backs and breasts.

The other countries had no exhibitors in the corset department.

REPORTS ON AWARDS.

GROUP X.

1. **Wanamaker & Brown, Philadelphia, Pa., U. S.**

CIVIL AND MILITARY CLOTHING.

Report.—Commended for fair skill in cut and workmanship, and as meritorious in price.

2. **John Wanamaker & Co., Philadelphia, Pa., U. S.**

CIVIL AND MILITARY CLOTHING.

Report.—Commended for fair skill in cut and workmanship, and as meritorious in price.

3. **H. P. Cooper, New York, N. Y., U. S.**

CLOTHING FOR GENTLEMEN.

Report.—Commended for skill in cut and workmanship, and as well adapted to the purpose intended.

4. **E. O. Thompson, Philadelphia, Pa., U. S.**

CLOTHING.

Report.—This is an exhibit of fancy clothing with United States gold and silver coin for buttons. The chief merit consists of skill in cut and careful workmanship.

5. **Devlin & Co., New York, N. Y., U. S.**

CIVIL AND MILITARY CLOTHING.

Report.—Commended for skill in cut, good quality and durability of the workmanship, and good taste in trimming.

6. **Sweet, Orr, & Co., Wappinger's Falls, N. Y., U. S.**

PANTALOONS, JACKETS, AND OVERALLS.

Report.—All the goods exhibited by this house are well cut, very strongly made, and sold at very low prices, and are in every way adapted to the wants of the working class.

7. **Pettingell & Sawyer, East Cambridge, Mass., U. S.**

WATER-PROOF OIL-CLOTH CLOTHES AND WATER-PROOF HATS.

Report.—The products consist of oil-cloth clothing, yellow, gray, and black, including hats, jackets, and overcoats, for yachtmen and car-drivers; jackets, pants, and overalls, for oystermen, fishermen, and butchers; miners' and Lincoln hats; souwesters; horse and wagon covers. The jackets and overcoats are of fine fabric, double thickness, the collars

faced with flannel, the whole well put together, and inner sleeve protects against storms. The overalls are secured by a large running cord at the waist. The caps and hats are of tasteful forms, and strongly made. Commended for thorough workmanship, taste, and fitness for intended use.

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8. P. B. Eager, Tower, & Co., Boston, Mass., U. S.

OIL-CLOTH CLOTHING.

Report.—The products consist of yellow oil-cloth jacket, of fine fabric, for yachtmen, with flannel facings for warmth and for dress, thoroughly made; of captain's overcoat, embroidered in front and on sleeves, faced with flannel, and having inner sleeves with close-fitting wristbands to keep out storm; of overalls or pants secured at the waist with buckle and leather belt, the latter fastened to the cloth with copper rivets. The buttons of the coat are of zinc, nickel-plated for the more expensive, and secured by twisted wire and strongly stayed. Also of block jackets, overalls, souwesters, and overcoats; all of fine fabric and well made. Commended for adaptation of buttons and belt to use in cold and storm, and for taste, workmanship, and quality.

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9. John G. McGee & Co., Belfast, Ireland.

ULSTER OVERCOATS FOR LADIES AND GENTLEMEN, TRAVELING AND CARRIAGE CLOAKS.

Report.—Commended for originality and variety of design, skill in cut, and good taste displayed in trimmings.

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10. T. G. Furneval, Canada.

CLOTHING.

Report.—Commended for skill in cut, appropriateness, taste in trimming, and good workmanship.

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11. R. F. Taylor & Son, Toronto, Ontario, Canada.

MEN'S CLOTHING.

Report.—Commended for fair skill in cut, and durable workmanship.

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12. J. S. May, St. John, New Brunswick.

CLOTHING FOR GENTLEMEN.

Report.—Commended for good material, fair skill in cut, and good workmanship.

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13. Nicetas Komarof, Moscow, Russia.

COLLECTION OF READY-MADE COATS MADE FROM DRESSED SHEEPSKINS.

Report.—Commended for adaptation, usefulness, good workmanship, and economy.

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14. Broosnitzyn & Sons, St. Petersburg, Russia.

WATER-PROOF LEATHER COAT WITH CAP AND CAPE COMBINED.

Report.—A specimen of leather tanning in the form of an overcoat together with a cap and cape combined. The hair side out presents a remarkably smooth, almost glossy, black finish. The texture and feel remind one of the finest samples of calf-skin. The sleeves and pockets are lined with Italian cloth, and the body and skirt with flannel of fine quality. The whole is substantially and thoroughly put together.

Commended for strength, finish, and water-proof quality.

15. Chief Intendency, St. Petersburg, Russia.

COLLECTION OF READY-MADE MILITARY CLOTHING.

Report.—This collection consists of—*a*, soldier's uniform of horse-guards men; *b*, under officer's uniform of life-guard; *c*, soldier's uniform of life dragoon of his Majesty's regiment of Moscow (army cavalry); *d*, soldier's uniform of 1st Nevsky regiment army infantry; *e*, soldier's uniform of 1st Turkestan battalion; soldiers' cloaks, gray, and gray with blue collar. These products are of very high order in cut and workmanship.

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16. Tailors' Society, Paris, France.

MEN'S CLOTHING.

Report.—The exhibit is large, the garments cut in a variety of styles, and show skill in cut, and good workmanship. Another feature worthy of notice is the fact that this is a society of journeymen tailors organized for their mutual protection and the improvement of their moral and intellectual condition.

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17. A. Pereira Rego, Lisbon, Portugal.

MILITARY CLOTHING.

Report.—Commended for good skill in cut, and fine workmanship.

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18. Antonio Mangeri, Messina, Italy.

MEN'S CLOTHING.

Report.—Commended for novelty and skill in cut, and fine workmanship.

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19. Salvatore Caldara, Palermo, Italy.

MEN'S CLOTHING.

Report.—Commended as meritorious in cut, and of good workmanship.

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20. Joh. Werner, Prague, Austria.

MEN'S CLOTHING.

Report.—Commended for great variety of the exhibit, fine skill in cut, good taste in trimmings, and fine quality of the workmanship.

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21. M. Mottl's Sons, Prague, Austria.

MEN'S CLOTHING.

Report.—Garments adapted to a great variety of purposes. Commended for high order of skill in cut, fine taste in trimmings, and highest grade of workmanship.

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22. Keller & Alt, Vienna, Austria.

CLOTHING.

Report.—Commended for great variety of product, skill in cut, and good workmanship.

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23. Beermann Straschitz, Prague, Austria.

MEN'S CLOTHING.

Report.—Commended for variety of the exhibit, fair skill in cut, and excellent workmanship.

24. **E. F. Fernlund, Stockholm, Sweden.**

CIVIL AND MILITARY CLOTHING.

Report.—Commended for skillful cut and excellent workmanship.

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25. **A. R. Wallgren, Stockholm, Sweden.**

MILITARY CLOTHING.

Report.—Commended for skill in cut, and good workmanship.

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26. **B. Wiki, Luzerne, Switzerland.**

MEN'S CLOTHING.

Report.—Commended for good material, skillful cut, and good workmanship.

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27. **Christian Möller, Copenhagen, Denmark.**

OIL-CLOTH CLOTHING.

Report.—The product consists of a white overcoat and cowl, two thicknesses throughout, of fine fabric, the collar and cowl lined with red flannel, edges throughout bound with flexible leather binding, strongly sewed; a jacket double-bound with leather, collar faced with flannel; the buttons are sewed to a strip of leather, which is strongly sewed to the lapel of both the coat and jacket; the button-holes are bound with soft, flexible leather, the fastening about the neck is with buckle and strap. The pants, double and reinforced about the knee, are secured at the waist with a leather string. The souwester is bound with leather, and leather ribs over the crown give stiffness to the form. Commended for leather bindings of edges and of button-holes; for mode of staying the buttons; for adaptation to use in severe weather; and for thorough workmanship.

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28. **Star Knitting Co., Cohoes, N. Y., U. S.**

COTTON, WOOL, AND MERINO UNDERWEAR.

Report.—Commended for uniformity in texture and finish.

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29. **C. A. Thudium & Son, Philadelphia, Pa., U. S.**

KNITTED JACKETS.

Report.—Commended for material used, and excellence in color and general finish.

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30. **W. K. Greene's Sons & Co., Amsterdam, N. Y., U. S.**

COTTON AND MERINO UNDERWEAR.

Report.—Commended as meritorious in view of cost and price.

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31. **John J. Glazier, Brother, & Co., Philadelphia, Pa., U. S.**

HOSIERY.

Report.—Commended for a large assortment of white and colored "circular" frame hose and half-hose, and high degree of excellence in bleach and finish.

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32. **A. B. Hapke, Harrisburg, Pa., U. S.**

KNIT GOODS.

Report.—Commended for a great variety of patterns, and excellence in style and design.

33. **Peck & Greene, Brooklyn, N. Y., U. S.**

WORSTED AND SILK GOODS FOR THEATRICAL, BOATING, AND GENERAL UNDERWEAR.

Report.—Commended for high standard in quality for the purposes intended.

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34. **Norfolk & New Brunswick Hosiery Co., New Brunswick, N. J., U. S.**

KNITTED UNDERWEAR FOR LADIES, GENTLEMEN, AND CHILDREN.

Report.—Commended for high grade of material used, excellence in fashion, and general finish.

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35. **American Hosiery Co., New Britain, Conn., U. S.**

UNDERWEAR AND HOSIERY OF WOOL, MERINO, AND COTTON.

Report.—Commended for high standard of excellence in texture and finish, and perfection in fashion and form.

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36. **G. H. Prindle, Philadelphia, Pa., U. S.**

KNIT GOODS.

Report.—A fine display of novelties made of zephyr yarn, and specially meritorious as to price, style, and quality.

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37. **Henry Gabriel & Sons, Allentown, Pa., U. S.**

HOSIERY OF COTTON AND WOOL.

Report.—Commended for excellence in wearing qualities, and a close resemblance in the general appearance to hand-knit goods.

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38. **Thos. Hughes & Co., Bristol, Pa., U. S.**

COTTON, MERINO, AND WOOL HOSIERY.

Report.—A large and varied collection, suitable for men, women, and children.

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39. **Henry Zaüner, Philadelphia, Pa., U. S.**

HAND-KNIT AND CROCHET ZEPHYR GOODS FOR INFANTS.

Report.—Commended as excellent in appearance, with a view to price.

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40. **Lowell Hosiery Co., Lowell, Mass., U. S.**

WOMEN'S PLAIN COTTON HOSE.

Report.—Commended for special adaptation to the use of the middle and working classes, in regard to price and quality.

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41. **Otis Co., Ware, Mass., U. S.**

HOSIERY AND UNDERWEAR.

Report.—Commended for excellence of texture, color, and finish in gauze underwear.

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42. **Martin Landenberger's Sons, Philadelphia, Pa., U. S.**

HOSIERY AND KNIT GOODS.

Report.—High degree of excellence in color and finish, superb in design, and specially commended for variety and assortment.

43. **Boston Manufacturing Co., Boston, Mass., U. S.**

COTTON HOSIERY.

Report.—Commended for excellent finish, especially in full and half fashioned products.

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44. **Wm. T. Hopkins, Philadelphia, Pa., U. S.**

UNDERGARMENTS FOR LADIES AND CHILDREN, AND INFANTS' DRESSES.

Report.—Commended for variety of design, good quality of material, and good workmanship.

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45. **Homer, Colladay, & Co., Philadelphia, Pa., U. S.**

UNDERWEAR FOR LADIES AND CHILDREN, AND INFANTS' DRESSES.

Report.—Commended for beauty in design and superior workmanship.

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46. **American Netting Underwear Co., C. H. Moeller, Propr., St. Louis, Mo., U. S.**

NETTED UNDERWEAR.

Report.—Commended for originality and novelty of construction with a view to ventilation, and excellence in fashion and finish.

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47. **Dana Bickford, New York, N. Y., U. S.**

KNITTED ARTICLES.

Report.—Commended for a great variety of designs and styles.

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48. **Pennsylvania Industrial Home for Blind Women, Philadelphia, Pa., U. S.**

KNITTED GOODS, BEAD-WORK, AND BASKETS.

Report.—Commended for good and substantial workmanship.

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49. **Annie E. Taylor, Philadelphia, Pa., U. S.**

KNITTED GOODS IN SILK AND WORSTED.

Report.—Commended for the excellent taste displayed in designs and colors.

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50. **I. & R. Morley, London, England.**

HOSIERY AND GLOVES.

Report.—Commended for high degree of excellence in style, color, and ornamentation.

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51. **Smyth & Co., Dublin, Ireland.**

HOSIERY.

Report.—Commended for the high standard for quality in every particular.

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52. **T. Turnbull, Galt, Ontario, Canada.**

KNITTED UNDERWEAR.

Report.—Commended for excellence in color, and high grade of fabric.

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53. **McCrae & Co., Guelph, Ontario, Canada.**

KNIT GOODS AND HOSIERY.

Report.—Commended for excellence of material used, and special adaptability to home markets, and cold climates generally.

54. **Ancaster Knitting Co., Hamilton, Ontario, Canada.**

KNITTED AND FANCY GOODS.

Report.—Commended for the large and varied assortment, and skill displayed in color and finish.

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55. **John Roonin, Moscow, Russia.**

KNIT GOODS AND HOSIERY.

Report.—Commended for excellent finish, substantial fabric, and adaptability to the purpose intended.

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56. **Nicholas Shereshefsky, Moscow, Russia.**

LADIES' UNDERWEAR AND GENTLEMEN'S SHIRTS.

Report.—Commended for variety of design, good quality of the material and workmanship, and economy in cost.

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57. **Walter Horving, Wiborg, Finland, Russia.**

KNIT GOODS.

Report.—Commended for excellence in style and workmanship.

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58. **Anne Winogradova, Nijni-Novogorod, Russia.**

HOSIERY AND CAPS FOR LADIES, WITH SWAN FEATHER TRIMMINGS.

Report.—Coats and fichus entirely braided with swan. Commended for handsome patterns and great novelty.

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59. **Poron Brothers, Troyes, France.**

HOSIERY.

Report.—A large and varied assortment, of good make, style, and finish.

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60. **C. Bullot, Paris, France.**

HOSIERY.

Report.—Commended for skill displayed in ornamentation, and high degree of excellence in texture, color, and finish.

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61. **Dujardin Brothers, Leuze, Belgium.**

COTTON AND WOOLEN HOSIERY.

Report.—Commended for skill displayed in workmanship and design, and as very excellent in view of price.

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62. **Oliver & Co., Mataro, Barcelona, Spain.**

HOSIERY AND UNDERWEAR.

Report.—Commended as of excellent finish and economical as to price.

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63. **Masoliver Brothers, Barcelona, Spain.**

HOSIERY AND UNDERWEAR.

Report.—Commended as of high degree of excellence in quality of fabric, and especially meritorious in regard to price.

64. **Luis Verderau, Spain.**

UNDERWEAR FOR LADIES AND CHILDREN, CHILDREN'S DRESSES, COLLARS, AND CUFFS.

Report.—Commended for variety, good taste, and good workmanship.

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65. **Ousta Yani, Adrianople, Turkey.**

WOOLEN HOSIERY.

Report.—Commended for substantial make and excellent finish.

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66. **Forol Yani, Trebizond, Turkey.**

HALF HOSE FOR MEN OR WOMEN.

Report.—Commended for beautiful finish and fine quality of material.

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67. **Frau Von Hake, Berlin, Germany.**

LADIES' UNDERWEAR.

Report.—Commended for good design and workmanship, and adaptability to the purpose intended.

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68. **Fr. Ehreg Woller, Stollberg, Germany.**

COTTON HOSIERY AND UNDERWEAR.

Report.—A very large and varied exhibit, excellent in quality and finish, and especially meritorious in view of price.

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69. **Carl Mez & Sons, Freiburg, Baden, Germany.**

OPEN MESH FILET UNDERWEAR IN COTTON AND SILK.

Report.—Commended for adaptability for the purpose intended, and economy in cost.

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70. **Miss Helen Cathrine Lundh, Christiania, Norway.**

KNITTED GOODS BY THE EXHIBITOR AT THE AGES OF FIVE AND SIX YEARS.

Report.—Commended for good style and workmanship.

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71. **Johs. Falkenberg, Christiania, Norway.**

UNDERWEAR FOR LADIES.

Report.—Commended for variety in design, good material, and fine needlework.

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72. **Meyer-Wæspi & Co., Altstetten, Switzerland.**

KNITTED UNDERWEAR.

Report.—Commended for large and varied assortment and excellence in make and finish.

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73. **Blumer & Wild, St. Gallen, Switzerland.**

HOSIERY AND FANCY KNIT GOODS.

Report.—Commended for new and unique designs, displaying good taste and workmanship.

74. **Al End-Ulme, Luzern, Switzerland.**

KNITTED UNDERWEAR.

Report.—Commended for a high degree of excellence in texture and finish.

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75. **Mrs. Olivia P. Flynt, Boston, Mass., U. S.**

WEATHER PROTECTOR FOR WOMEN AND CHILDREN.

Report.—Commended for novelty, entire fitness for purpose intended, and as being well made.

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76. **Sharpless & Sons, Philadelphia, Pa., U. S.**

COSTUMES FOR LADIES.

Report.—Commended for excellent taste in design, skill in cut, and good workmanship.

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77. **Mrs. E. Keyser, Philadelphia, Pa., U. S.**

MISSES' CLOTHING AND INFANTS' OUTFITS.

Report.—Commended for good taste in design and good work.

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78. **Madame Demorest, New York, N. Y., U. S.**

FASHIONS, PAPER PATTERNS, DRESS CUTTING SYSTEM, AND SHIRT AND STOCKING SUSPENDERS.

Report.—Commended for variety of production, good quality of the products, simplicity and excellence of the dress-cutting system, and economy in cost.

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79. **S. T. Taylor, New York, N. Y., U. S.**

DRESS-CUTTING SYSTEM AND PATENT BIAS CUTTER.

Report.—Commended for skill in the preparation of the system of dress cutting, and adaptability in the bias cutter to the purpose intended.

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80. **Mrs. Elmira Cornwell, Philadelphia, Pa., U. S.**

GRADUATED CHART FOR DRESS CUTTING.

Report.—Commended as original, well fitted to the purpose intended, and economical in cost.

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81. **Mrs. B. A. Stearns, Woburn, Mass., U. S.**

GRADUATED CHART FOR DRESS CUTTING.

Report.—Commended for good form, adaptation to public wants, and economy in cost.

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82. **Hitchcock, Williams, & Co., London, England.**

COSTUMES OF MIXED FABRICS FOR LADIES.

Report.—Commended for excellent taste in design, skill in cut, and fine workmanship.

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83. **Brown & Clagget, Montreal, Canada.**

COSTUMES FOR LADIES.

Report.—Commended for variety in design, taste in trimmings, and as being well made.

84. **Petrof & Medvedef, St. Petersburg, Russia.**

CLOTHING FOR LADIES AND CHILDREN.

Report.—Commended for great variety of styles, good quality of the material used, good taste and skill, and excellent workmanship.

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85. **A. Levilion, Paris, France.**

COSTUMES FOR LADIES.

Report.—Commended for exquisite taste in the selection of material and trimmings, fine skill in cut, and excellent workmanship.

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86. **Mme. Augustine Cohn, Paris, France.**

COSTUMES FOR LADIES.

Report.—Commended for fine taste in the selection of the materials and trimmings, great skill in cut, and excellent workmanship.

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87. **Mme. Vauthier, Paris, France.**

CHILDREN'S CLOTHING.

Report.—Commended for variety in design, good taste in trimming, and good workmanship.

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88. **L. Terrillon, Paris, France.**

LADIES' DRESSES AND OTHER ARTICLES FOR LADIES' WEAR; FOULARDS.

Report.—Commended for good variety in patterns, taste, and fine workmanship.

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89. **American Molded Collar Co., Boston, Mass., U. S.**

COMBINED CLOTH AND PAPER COLLARS.

Report.—Commended for originality, quality, and adaptation to the public wants.

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90. **Lockwood Manufacturing Co., Philadelphia, Pa., U. S.**

PAPER COLLARS.

Report.—Commended for excellence in quality and economy in cost.

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91. **Rothschild Brothers & Gutmann, New York, N. Y., U. S.**

SHIRTS, DRAWERS, AND UNDERWEAR.

Report.—Commended for novelty in design of the "two in one shirt," large variety of styles, good workmanship, and economy in cost.

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92. **James Hayden, Philadelphia, Pa., U. S.**

SHIRTS AND DRAWERS.

Report.—Commended for the good material used, fine workmanship, and skill in drawers cutting.

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93. **Michaelis & Kaskel, New York, N. Y., U. S.**

SHIRTS AND UNDERWEAR.

Report.—Commended for variety in design, excellence of the workmanship, and for fine embroideries.

94. **Henry Atkinson, Philadelphia, Pa., U. S.**

BUCKSKIN SHIRTS AND DRAWERS.

Report.—Commended for the buckskin shirts and drawers, skillful in cut, and of fine workmanship.

95. **Judson Brothers, New York, N. Y., U. S.**

SHIRTS AND DRAWERS.

Report.—Commended for merit in cut and workmanship.

96. **Conrad Brothers, Philadelphia, Pa., U. S.**

SHIRTS, COLLARS, AND CUFFS.

Report.—Commended for variety in designs, good quality of the material, and good workmanship.

97. **Skelton Tooke & Co., Montreal, Canada.**

SHIRTS, COLLARS, AND CUFFS.

Report.—Commended for variety in design, good quality of the material used, good work, and economy in cost.

98. **Conde, Puerto, & Co., Spain.**

MEN'S SHIRTS.

Report.—Commended for a great variety of patterns and styles, and good workmanship; very economical in cost. The firm is also worthy of notice for maintaining a school at their own expense for the education of the children of their workmen.

99. **A. & C. Kaufmann, Berlin, Germany.**

PAPER COLLARS AND CUFFS, AND SHIRT FRONTS.

Report.—Commended for variety in design, good work, and a close imitation in embroidery to the genuine article.

100. **Hess Brothers, Amrisweil, Switzerland.**

COLORED COTTON SHIRTS.

Report.—Commended for variety of patterns, and great economy in cost.

101. **United States Corset Co., New York, N. Y., U. S.**

WOVEN CORSETS.

Report.—Commended for cheapness, durability, and good form.

102. **Geo. Frost & Co., Boston, Mass., U. S.**

CORSETS, WAISTS, HOSE SUPPORTER, AND EMANCIPATION CORSET.

Report.—Commended as specially meritorious for young females.

103. **Jacobs, Strouse, & Co., New York, N. Y., U. S.**

CORSET STEELS OR BUSKS.

Report.—Commended for strength and finish, combined with economy in cost.

104. **Madame Demorest, New York, N. Y., U. S.**

CORSETS.

Report.—Commended for utility, form, and fashion, and high degree of excellence in workmanship.

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105. **Boston Comfort Corset Co., Boston, Mass., U. S.**

CORSETS WITHOUT BONES.

Report.—Commended for merit in the substitution of cords in place of bones; also for good workmanship.

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106. **Worcester Corset Co., Worcester, Mass., U. S.**

CORSET AND SKIRT SUPPORTER.

Report.—Commended for originality in cut and form, good material, good workmanship, and economy in cost.

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107. **A. W. Thomas, Philadelphia, Pa., U. S.**

BUSTLE AND SKIRT ELEVATOR AND BOSOM FORM.

Report.—Commended for originality, skill in workmanship, and adaptation to the purpose intended.

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108. **Mrs. H. S. Hutchinson, New York, N. Y., U. S.**

SKIRT SUPPORTING WAIST AND UNDER GARMENTS.

Report.—Commended for novelty in design, and adaptation to the purpose intended, and for good workmanship.

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109. **Brewster Brothers & Co., Birmingham, Conn., U. S.**

COMBINED CORSET AND SKIRT SUPPORTERS.

Report.—Commended for good taste, material, workmanship, and great merit in summer corset (open work).

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110. **M. Cohn & Co., New York, N. Y., U. S.**

WOVEN CORSETS.

Report.—Important as a national industry. Commended for high degree of excellence in form, quality, and ornamentation; also for economy in cost.

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111. **Fay & Reynolds, Boston, Mass., U. S.**

JACQUELINE CORSETS AND MISSES' WAISTS.

Report.—Commended for excellence in form and quality.

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112. **Mrs. Harriet M. Chapman, Philadelphia, Pa., U. S.**

SKIRT SUPPORTING SHOULDER BRACE AND PUFF CORSET.

Report.—Commended for special merit in accomplishing the purpose of its construction.

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113. **P. Lenoir, Paris, France.**

CORSETS.

Report.—Commended for excellence in workmanship; especially for the corsets finished with elastic cords.

114. **Farey & Oppenheim, Paris, France.**

CORSETS.

Report.—Commended for high degree of excellence in fashion, form, and ornamentation.

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115. **José Cardona Baldrich, Barcelona, Spain.**

WOVEN OPEN WORK, HYGIENICAL, AND SURGICAL CORSETS.

Report.—Commended for great variety and importance as a national industry, and especially for utility and workmanship.

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116. **J. M. Ottenheimer & Sons, Stuttgart, Germany.**

WOVEN CORSETS.

Report.—Commended for good quality and workmanship, combined with economy in cost and importance as a national industry.

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117. **Gros & Co., Bruchsal, Germany.**

CORSETS.

Report.—Commended for excellence in form and quality, and for economy in cost.

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118. **James McLintock & Sons, Barnsley, Yorkshire, England.**

DOWN QUILTS, SKIRTS, PILLOWS, JACKETS, AND DRESSING GOWNS.

Report.—Commended for originality, utility, and fitness for the purpose intended.

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119. **Geo. Turner & Co., London, England.**

MILITARY AND TRAVELING EQUIPMENTS, HAMMOCK AND VALISE.

Report.—Commended for originality, portability, and adaptation to the purpose intended.

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120. **J. A. H. Leynen-Hougaerts, Peer, Limbourg, Belgium.**

CHURCH VESTMENTS.

Report.—Chasubles and church vestments of first-rate execution, fine taste, and at very low prices.

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121. **Elias Shadrin, Moscow, Russia.**

CHURCH VESTMENTS.

Report.—Church images and pieces of vestments, with precious stones and gilt embroideries, all hand-made, of the most elegant style. Commended for originality, artistic taste, and superior workmanship.

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122. **Royal War Office, Investment Department, Stockholm, Sweden.**

COMPLETE EQUIPMENT OF FOOT AND MOUNTED SOLDIERS.

Report.—Soldiers' uniforms merit great attention.

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123. **J. A. Ek, Stockholm, Sweden.**

MILITARY EQUIPMENTS.

Report.—Commended for high quality and workmanship.

124. **Yates, Wharton, & Co., Newark, N. J., U. S.**

HATS.

Report.—Commended for good style and workmanship, and economy in cost.

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125. **R. Dunlap & Co., New York, N. Y., U. S.**

HATS.

Report.—Commended for fine quality of the material used, and high grade of workmanship, and excellent taste in trimmings.

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126. **Haverhill Hat Co., Haverhill, Mass., U. S.**

WOOL HATS.

Report.—Commended for good styles and great economy in price; a product for the people.

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127. **Schuyler, Hartley, & Graham, New York, N. Y., U. S.**

MILITARY HATS AND CAPS.

Report.—Commended for good and various fashions, high quality.

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128. **J. S. Bancroft & Co., New York, N. Y., U. S.**

HATS.

Report.—Commended for variety of production, good quality, and fine workmanship.

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129. **Christian Nonenberger, Philadelphia, Pa., U. S.**

HATTERS' BLOCKS AND TOOLS.

Report.—Commended for variety of product and general utility, and adaptability to the purpose intended.

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130. **E. Morris & Co., Philadelphia, Pa., U. S.**

SILK, SOFT, AND STIFF HATS.

Report.—Commended for good material, good style, and workmanship.

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131. **John B. Stetson & Co., Philadelphia, Pa., U. S.**

SOFT AND STIFF FINE FUR-FELT HATS.

Report.—Commended for fine material used, variety in styles, and fine workmanship.

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132. **Blaylock & Co., Philadelphia, Pa., U. S.**

SILK HATS.

Report.—Commended for quality of material and workmanship.

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133. **Pierson & Herman, Newark, N. J., U. S.**

HAT BLOCKS, FLANGES, AND HATTERS' TOOLS.

Report.—Commended for good work, and adaptability to the purpose intended.

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134. **Jos. Schiller & Co., St. Louis, Mo., U. S.**

HATS.

Report.—Commended for good and various fashions, quality, and economy in cost.

135. **J. H. Fenton & Brother, Philadelphia, Pa., U. S.**

HATS.

Report.—Commended for variety in styles, and good quality.

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136. **Alden Solmans, South Norwalk, Conn., U. S.**

HATS.

Report.—Commended for good fashions and fine quality.

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137. **F. H. Amidon's Son, New York, N. Y., U. S.**

HATS AND CAPS.

Report.—Commended for good material used, good style, and workmanship.

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138. **Mrs. Orpha Conant, Dwight, Ill., U. S.**

HAT OF COMMON JUNE GRASS.

[Made by the exhibitor in her eighty-fourth year.]

Report.—Commended for utility and economy, and for skill displayed in workmanship.

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139. **Lincoln, Bennett, & Co., London, England.**

HATS.

Report.—Commended for great variety, good taste, and moderate price.

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140. **Tress & Co., London, England.**

PITH AND FELT SOLAR HATS AND HELMETS.

Report.—Commended for great variety, good taste, moderate prices, and special novelty in the Indian and tropical hats.

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141. **Mrs. Trancilla Nash, Jamaica, West Indies.**

HATS AND FLOWER LACE.

Report.—Exhibits various specimens of hats and flower lace made of Spanish dogger, a kind of dry and dyed yucca leaves (*yucca aloifolia*) and lace bark (*logetta lintearia*). This exhibit shows how those leaves may be made serviceable.

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142. **I. Popp, Riga, Russia.**

FELT HATS.

Report.—Commended for good taste and quality.

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143. **Theodore Weigt, Warsaw, Russia.**

HATS, SILK AND FELT.

Report.—Commended for good taste and quality.

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144. **Edward Loth, Warsaw, Russia.**

STRAW AND FELT HATS FOR LADIES AND GENTLEMEN.

Report.—Commended for good taste, good design, fine workmanship.

145. **Leon Wilken (firm, Vandrague), Moscow, Russia.**

HATS AND CAPS.

Report.—Commended for variety, good taste, and high quality of product.

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146. **Basil Tchistiakof, St. Petersburg, Russia.**

HATS AND CAPS.

Report.—Commended for variety, good taste, and high quality of product.

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147. **E. Nazarof, St. Petersburg, Russia.**

HORSE GUARD HELMETS.

Report.—Commended for high quality of workmanship.

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148. **R. Wakamatsu, Minakuchi, Orni, Japan.**

HATS MADE FROM WOOD FIBRE (WISTERIA CHINENSIS).

Report.—Commended for good workmanship, durability, and economy in cost.

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149. **Pierre Némoz, Paris, France.**

CHILDREN'S AND LADIES' FELT HATS.

Report.—Commended for nice patterns, good quality of material, flowers and feathers, tasteful variety, and fine style.

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150. **J. B. Ruffin, Paris, France.**

HATS FOR LADIES AND CHILDREN.

Report.—Commended as well made, of good finish, novel patterns, and of elegant style.

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151. **Gregorio Sartou, Seville, Spain.**

HATS.

Report.—Commended for high quality, fine fashion, and lightness of felt hats.

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152. **Mateo de Horna, Zamora, Spain.**

HATS.

Report.—Commended for good taste, various fashions, and moderate prices. He has also a school for educating the children of his workmen.

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153. **Francisco Villasante, Madrid, Spain.**

HATS.

Report.—Commended for good taste and moderate prices.

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154. **Guillermo Huelin & Son, Malaga, Spain.**

PALMETTO HATS.

Report.—Very fine and well made patterns; moderate prices.

---

155. **Juan M. Rojas, Manila, Philippine Islands.**

HATS, MADE OF MANILA STRAW OF THE FINEST BRAID.

Report.—Commended for very light and good shape, superior material and workmanship.

156. **Custodio José Rodrigues, Braga, Portugal.**

HATS.

Report.—Commended on account of importance to the country and economy in cost.

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157. **Santos & Brother, Ovar, Portugal.**

HATS.

Report.—Commended for good fashions and high quality.

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158. **Maia & Silva, Son, & Goncalves, Oporto, Portugal.**

HATS.

Report.—Commended for high quality of products.

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159. **Costa Braga & Son, Oporto, Portugal.**

HATS.

Report.—Chief merit consists in the soft felt hats. Commended for very superior quality, lightness, and good taste.

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160. **Widow of A. Roxo, Lisbon, Portugal.**

HATS.

Report.—Commended for great variety, high quality, and novelty.

---

161. **Lima Carvalho, Fayal, Portugal.**

STRAW HATS.

Report.—Commended for good taste, good material, and fine workmanship.

---

162. **Agricultural Fluminense Institute, Rio de Janeiro, Brazil.**

FELT HATS AND HATS FROM BAMBOO.

Report.—Commended for good taste and workmanship.

---

163. **Fernandes Braga & Co., Rio de Janeiro, Brazil.**

FELT STIFF HATS.

Report.—Commended for good quality and taste.

---

164. **Francisco Fisher, São Paulo, Brazil.**

SILK AND FELT STIFF HATS FOR LADIES AND GENTLEMEN.

Report.—Silk hats of good quality and in excellent taste.

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165. **Bierrenback & Brother, São Paulo, Brazil.**

STIFF AND SOFT HATS OF SILK AND FELT.

Report.—Commended for lightness and thinness combined with durability.

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166. **Flora P. Reguião, Bahia, Brazil.**

SILK, FELT, AND BAMBOO HATS.

Report.—Commended for good quality, fashion, and workmanship, especially in bamboo hats.

167. **Serafin & Corneiro, Buenos Ayres, Argentine Republic.**

HATS.

Report.—Commended for very fine quality.

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168. **Buffeti & Maya, Buenos Ayres, Argentine Republic.**

HATS.

Report.—Commended for good taste and workmanship.

---

169. **Cesare la Farina, Palermo, Italy.**

HATS.

Report.—Commended for various fashions, good taste, and moderate prices.

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170. **Gaetano Taddei, Florence, Italy.**

STRAW HATS AND BRAIDED STRAW, STRAW SHOES AND SLIPPERS FOR LADIES.

Report.—Commended for good make, fine patterns, and great cheapness.

---

171. **Santini Brothers, Florence, Italy.**

STRAW HATS AND BRAIDED STRAW.

Report.—Great variety in regular trade style, well made, fine material, good finish, very moderate prices.

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172. **Gabriele Rumieri, Naples, Italy.**

SILK AND FELT HATS.

Report.—Commended for various fashions and good taste.

---

173. **Agostino Duranti, Florence, Italy.**

LADIES' STRAW HATS.

Report.—Commended for very fine work, large variety, and excellent quality of material.

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174. **Gio Giacomo Kubli, Florence, Italy.**

STRAW HATS.

Report.—Commended for handsome variety, large manufacture (exporting for England and United States), cheapness, and fine workmanship.

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175. **Workingmen's Benevolent Association, Falerone, Italy.**

STRAW HATS.

Report.—Commended as a large variety, well fitted, good material, and low prices.

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176. **T. Huckel's Sons, Neutitschein, Austria.**

HATS.

Report.—Chief merit consists in the soft fur felt hats. Commended for good work and high quality of material.

---

177. **John Skrivau & Son, Vienna, Austria.**

HATS.

Report.—Commended for great variety and high quality.

178. **P. & C. Habig, Vienna, Austria.**

HATS.

Report.—Commended for variety, good taste, and high quality.

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179. **E. Th. Indermühle, Berne, Switzerland.**

STRAW HATS.

Report.—Commended as well made, good finish, first-rate material, and cheap.

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180. **Conrad Walser, Wohlen, Switzerland.**

STRAW HATS, PLAITS, IMITATION IN COTTON OF HORSE HAIR BRAIDS.

Report.—Commended for first-rate execution, cheapness, and fine workmanship.

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181. **Chiesa Brothers, Locarno, Canton de Tessin, Switzerland.**

BRAIDS AND STRAW HATS, CANTON TESSIN A SPECIALTY.

Report.—Well made, good material, and fine finish.

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182. **Daniel Hays, Gloversville, N. Y., U. S.**

BUCKSKIN AND PECCARY-SKIN GLOVES AND GAUNTLETS.

Report.—Commended for elegant patterns, good quality, skill, and workmanship.

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183. **John C. Hutchinson, Johnstown, N. Y., U. S.**

GLOVES AND GAUNTLETS TRIMMED WITH FUR AND LINED WITH WOOLEN PLUSH.

Report.—Commended as cheap, well made, and tasteful.

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184. **W. S. & M. S. Northrup & Co., Johnstown, N. Y., U. S.**

GLOVES AND GAUNTLETS (WELL SEWED AND FITTED UP).

Report.—Commended for fine workmanship and taste in patterns.

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185. **F. E. Colwell & Co., Chicago, Ill., U. S.**

HUSKING GLOVES.

Report.—Commended for novelty and adaptation to a general public want, for husking corn.

---

186. **Fortuné Hegle, New York, N. Y., U. S.**

KID GLOVES.

Report.—Commended for high degree of excellence in quality, form, and fashion, and especially meritorious in the Suede quality.

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187. **J. & R. Morley, London, England.**

CLOTH, BEAVER, THREAD, AND COTTON GLOVES.

Report.—Commended for large variety, fitness, and cheapness.

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188. **Debenham & Freebody, London, England.**

GLOVES.

Report.—Very finely cut, sewed, and shaded in colors. Commended for fine workmanship and quality.

189. **Sarda (successor of Boyer), St. Petersburg, Russia.**

GLOVES.

Report.—Good cut; well sewed; well finished; fine workmanship.

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190. **Perrin Brothers, Grenoble, France.**

KID GLOVES WITH FINE EMBROIDERY OF ELEGANT MONOGRAMS.

Report.—Commended for good patterns and elegant taste; also for cheapness.

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191. **Hegle, Glandines, & Corbeau, Paris, France.**

LADIES' KID GLOVES.

Report.—Well tanned and dyed skins; good workmanship and taste.

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192. **Widow Buscarlet & Maló, Paris, France.**

KID GLOVES.

Report.—Very well dyed; fine material; excellent workmanship.

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193. **Eugene Berr, Paris, France.**

KID GLOVES.

Report.—Well cut and finished; tasteful patterns; extraordinary cheapness.

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194. **Xavier Jouvin, Paris, France.**

KID GLOVES.

Report.—Rich variety; first-rate quality; well cut; fine material; superior taste and workmanship.

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195. **Léon Level, Brussels, Belgium.**

KID GLOVES.

Report.—A fine assortment of kid gloves nicely finished; good color; elegant patterns; well cut, and very cheap.

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196. **Felipe Stampa, Valladolid, Spain.**

KID AND LINED GLOVES.

Report.—Commended as of good quality, well fitted, and very cheap.

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197. **Diogo Jorge, Lisbon, Portugal.**

GLOVES OF ALL KINDS.

Report.—Great variety: colors, cut, and sewing very good; commended for skill and workmanship.

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198. **Oporto Glove Co., Oporto, Portugal.**

LAMB AND KID GLOVES.

Report.—Commended for good colors, elegant patterns, and great cheapness.

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199. **Bernardino Antunes da Silva, Lisbon, Portugal.**

REAL KID GLOVES.

Report.—Well cut and sewed; good workmanship, and cheapness.

200. **A. Cusset, City of Mexico, Mexico.**

KID GLOVES.

Report.—Great progress for the short time of its existence; good material; well cut and sewed.

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201. **Eduardo Bossi, Naples, Italy.**

GLOVES FROM LAMB, DOG, AND CAT SKINS.

Report.—Gloves from lamb, dog, and cat skins; commended for elegant patterns, especially in driving gloves; good finish, and very cheap prices.

---

202. **J. L. Ranniger & Sons, Altenburg, Germany.**

LAMB-SKIN GLOVES.

Report.—Commended for great variety, skill, and workmanship.

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203. **Daniel Jeitteles, Esslingen-on-the-Maine, Germany.**

LEATHER GLOVES.

Report.—Well cut, well sewed; great variety of colors, good patterns, and cheapness.

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204. **Heinrich Lehmann, Berlin, Germany.**

KID AND WASH GLOVES.

Report.—Commended for wash gloves of very good quality, good shape, and cheap.

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205. **Heinrich Gulden, Chemnitz, Germany.**

GLOVES OF THREAD, SILK, AND CLOTH.

Report.—Commended for tasteful patterns and cheapness.

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206. **John Nep Kubik, Stuhlweissenburg, Austria.**

REAL KID AND WINTER GLOVES.

Report.—Handsomely lined, well cut, well finished. Commended for skill and workmanship.

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207. **V. d. Aue & Kollmann, Prague, Austria.**

LAMB-SKIN GLOVES.

Report.—Commended for excellent quality; large manufacturing for export; at a moderate price.

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208. **Anton Pilot, Prague, Austria.**

LAMB-SKIN GLOVES.

Report.—Well-made seamless patterns. Commended for cheapness and novelty.

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209. **Franz & Max Stiasny, Vienna, Austria.**

LEATHER GLOVES.

Report.—Very finely finished; application of the ridelle, the first house which introduced cutting by machinery. Commended for good material and good style.

210. **Simon Dewidels, Prague, Austria.**

LAMB-SKIN GLOVES (LARGE MANUFACTURE).

Report.—Commended for tasteful style and cheapness.

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211. **Ludwig Stoger, Vienna, Austria.**

LADIES' GLOVES (TWO BUTTONS).

Report.—Commended for very fine cut, fine material, and superior workmanship.

---

212. **Anton Frese, Prague, Austria.**

LAMB-SKIN GLOVES.

Report.—Commended for good quality, cheapness, and fine workmanship.

---

213. **Alois Port, Vienna, Austria.**

LADIES' LAMB-SKIN GLOVES (TWO BUTTONS).

Report.—Nicely cut; good style; excellent workmanship.

---

214. **J. U. Bencker, Prague, Austria.**

LAMB-SKIN GLOVES.

Report.—Commended for fine aniline colors, good material, and low prices.

---

215. **Edward Branneck, Vienna, Austria.**

LADIES' LAMB-SKIN GLOVES (TWO BUTTONS).

Report.—Commended as well made and extraordinarily cheap.

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216. **Gabriel Mayer, Luxemburg, Grand Duchy of Luxemburg.**

KID SKIN AND GLOVES.

Report.—Commended for great variety of kid skin and gloves for ladies and gentlemen; fine shades of colors; good material; elegance in patterns; and very moderate prices.

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217. **Charles Auguste & Co., Luxemburg, Grand Duchy of Luxemburg.**

KID SKINS AND GLOVES.

Report.—A very nice display of kid skins and gloves; good colors; well sewed. Commended for high workmanship and great cheapness.

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218. **G. Swedmark, Malmö, Sweden.**

LAMB AND KID SKIN GLOVES.

Report.—Lamb and kid skin gloves, well finished, good colors, elegant patterns, and very low prices.

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219. **M. Jacoby & Co., Nottingham, England.**

VALENCIENNES AND SILK GUIPURES.

Report.—Valenciennes and silk guipures; imitations of Swiss curtains, lace curtains, black and colored laces, warranted fast. Commended for good make, handsome design, and high skill in the various products.

220. **Mrs. R. A. Wicksteed, Ottawa, Canada.**

POINT LACES.

Report.—Commended for great excellence in taste and workmanship.

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221. **Miss Sidney Smith, Dundas, Canada.**

LACE WORK HANDKERCHIEF.

Report.—Commended for excellent taste and fine workmanship.

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222. **Mrs. Nunn, Belleville, Canada.**

POINT LACE.

Report.—Commended as tasteful in design and excellent in workmanship.

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223. **Miss Isabella Fairbanks, Halifax, Nova Scotia.**

LACE HANDKERCHIEF.

Report.—Commended for good taste and very fine workmanship.

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224. **Verdé, Delisle & Co., Brussels, Belgium, and Paris, France.**

LACE.

Report.—This firm exhibits, in Belgium and France, the most magnificent sets of French and Belgian laces. Commended for superior taste, great novelty, and first-rate workmanship.

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225. **Herbelot & Devot, St.-Pierre-les-Calais, France.**

LACES.

Report.—Commended for a fine exhibit of tulle, blond, and imitations of laces; large variety of patterns, good style, good finish, and first-rate workmanship.

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226. **Dognin & Co., Paris, France.**

INDIA AND CHANTILLY LACES.

Report.—A most elegant variety, very handsome and new patterns, fine workmanship, novelty, and superior taste.

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227. **Frances Brothers, St.-Pierre-les-Calais, France.**

IMITATION OF SILK GUIPURES, WOOLEN AND SILK LACES.

Report.—Commended for nice drawings, elegance in style, great variety in patterns, and cheapness in prices.

---

228. **Bacquet Father & Co., St.-Pierre-les-Calais, France.**

MACHINE-MADE LACES.

Report.—Commended for superior design, fine taste, and quality. They exhibit some very tasteful patterns of Venetian lace, thread lace, and voide ulanaix, showing very high improvements in working.

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229. **Robert Haxton & Co., St.-Pierre-les-Calais, France.**

IMITATION OF LACES, MADE BY MACHINERY.

Report.—Commended for elegant style in designs and fine workmanship.

230. **Collective Exhibit of the Calvados Manufacturers, France.**

LACES.

Report.—A full and magnificent set of these French celebrated laces, very excellent taste in designs, elegant patterns, and fine workmanship.

---

231. **Réné Bergerem, Ypres, Belgium.**

VALENCIENNES LACE.

Report.—A good display of regular trade ware. Commended for skill and workmanship.

---

232. **Buchholz & Co., Brussels, Belgium.**

LACE.

Report.—A very nice dress of the finest work and design, and a large variety of elegant other patterns in vellum lace. Commended for fine workmanship and nice designs.

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233. **O. de Vergniers & Sisters, Brussels, Belgium.**

LACE.

Report.—Very fine Grammont lace for parasols, light loose garments, and coiffures. Commended for tasteful designs and elegance in style.

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234. **Bruyneel, Senior, Grammont, Belgium.**

BLACK LACE.

Report.—Commended for great variety, excellent quality, good patterns, and high skill.

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235. **Julie Everaert & Sisters, Brussels, Belgium.**

LACES.

Report.—Black lace of fine quality, laces for handkerchiefs and fans, and fair variety of other laces. Commended for elegance in style and high finish.

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236. **Saligo Vanden Berghe, Grammont, Belgium.**

BLACK LACE.

Report.—Nice dresses for ladies, of black lace. Commended for fine execution and very elegant style in designs.

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237. **Ghys-Bruyneel, Grammont, Belgium.**

BLACK LACE.

Report.—Commended for handsome execution of all kinds of black lace, good patterns, and fine workmanship.

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238. **L. Sacré, Brussels, Belgium.**

LACES.

Report.—Splendid display of all kinds of laces for garments, fans, and dresses, in a very high style and of superior finish.

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239. **Gillon-Steyaert, Courtrai, Belgium.**

VALENCIENNES LACE.

Report.—A nice display of real Valenciennes laces, with applicated flowers, producing good effect. Commended for handsome patterns and good finish.

240. B. De Groote-Vierendeel, Grammont, Belgium.

LACES.

Report.—A full set of fine black lace for garments, parasols, bonnets, and mantillas, of a regular and good make; fine quality.

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241. Vandezande Goemaere, Courtrai, Belgium.

VALENCIENNES LACE.

Report.—Remarkable variety of real Valenciennes lace, and fancy garments of great breadth; handsome set of dresses. Commended for superior skill and workmanship.

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242. Asylum of San Manuel, Malaga, Spain.

LACE WORK.

Report.—Commended for excellent taste and very fine workmanship.

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243. Charity School of the Ladies' Catholic Association, Madrid, Spain.

LACE AND EMBROIDERED HANDKERCHIEF AND PRIEST'S VESTMENT.

Report.—Commended for great excellence in design and very superior workmanship.

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244. Lady Augusto de Barros Piemental, Rio de Janeiro, Brazil.

LACE WORK.

Report.—Commended for excellent taste and fine workmanship.

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245. D. G. Döerffel's Sons, Eibenstock, Germany

EMBROIDERIES AND LACE CURTAINS.

Report.—Lace curtains, all hand-made, very fair in design and skill; also very good patterns of embroideries made by machinery. Commended for good work, taste, and design.

---

246. J. Stramitzer, Vienna, Austria.

POINT GAUZE TAPE LACE.

Report.—Point gauze tape laces in an elegant style; good finish and nice taste.

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247. Bernhard Metzner, Graslitz, Austria.

LACES, HANDKERCHIEFS, AND FAN DECORATIONS.

Report.—Commended for variety of laces, lace ruches, handkerchiefs, and fan decorations, of good style and first-rate workmanship.

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248. The Society "Friends of Handiwork," Stockholm, Sweden.

LACE WORK AND EMBROIDERY.

Report.—Commended for excellence in taste and workmanship.

---

249. Hirschfeld Brothers & Co., St. Gallen, Switzerland.

SWISS LACE CURTAINS.

Report.—Swiss lace curtains made by hand. Commended for great variety in products, high taste in the patterns, very good finish, and superior workmanship.

250. **Mrs. Helena Fuchs, St. Louis, Mo., U. S.**

SILK EMBROIDERED LACE DRESS, WITH POINT-LACE TRIMMINGS.

Report.—Hand-made embroideries, well shaded in silk colors, fine drawing.

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251. **St. John's Guild, New Haven, Conn., U. S.**

EMBROIDERIES.

Report.—Commended for artistic taste in design, and skill in workmanship.

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252. **Convent of the Sacred Heart, Elmhurst, Providence, R. I., U. S.**

KNIT GOODS AND EMBROIDERY.

Report.—Commended for taste in style and skill in workmanship.

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253. **Jeff. O. Bentley, Philadelphia, Pa., U. S.**

EMBROIDERIES AND BRAIDED AND STAMPED GOODS.

Report.—Commended for superiority of workmanship, tasteful monograms, and fine embroidered pocket-handkerchiefs.

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254. **Union Benevolent Association, Philadelphia, Pa., U. S.**

EMBROIDERY AND NEEDLE WORK.

Report.—Commended for excellent taste and good workmanship.

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255. **Mrs. W. G. Weld, Jamaica Plains, Mass., U. S.**

EMBROIDERED PANELS.

Report.—Commended for artistic taste, skill, and superior execution.

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256. **Miss Victoria Walker, Providence, R. I., U. S.**

SILK EMBROIDERY.

Report.—Commended for good taste and workmanship.

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257. **Mrs. Sarah E. Anthony, Smyrna, Del., U. S.**

MASONIC AND HISTORICAL EMBROIDERED PICTURE.

Report.—Commended for originality in design and excellence in workmanship.

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258. **Mrs. M. S. M. Riley, Louisville, Ky., U. S.**

EMBROIDERY AND NEEDLE WORK.

Report.—Commended for a great display of artistic taste and skill, and very high degree of excellence in execution.

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259. **Mrs. C. Hewitt Pfordt, Albany, N. Y., U. S.**

EMBROIDERY.

Report.—Commended for great taste in design and workmanship, displaying extraordinary skill.

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260. **Miss Susan E. Hall, Hartley Hall, Lycoming Co., Pa., U. S.**

EMBROIDERY FOR CHURCH PURPOSES.

Report.—Commended for artistic taste and skill displayed in designs, and very high order of workmanship.

261. **Mrs. L. B. Converse, Worcester, Mass., U. S.**

EMBROIDERY.

Report.—Commended for excellence in design and taste, with great skill in execution.

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262. **Mrs. Jennie Ansorge & Miss Flora Bach, New York, N. Y., U. S.**

TABLE COVER, EMBROIDERY AND NEEDLE WORK.

Report.—Commended for good taste and excellent workmanship.

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263. **Miss Lizzie Todd, Columbus, Ohio, U. S.**

EMBROIDERY.

Report.—Commended for excellent taste and superior workmanship.

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264. **Miss Sarah R. Bodtker, Wisconsin, U. S.**

EMBROIDERY.

Report.—Commended for great taste in design and skill in execution.

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265. **Employment Society, Providence, R. I., U. S.**

INFANTS' CLOTHING AND EMBROIDERIES.

Report.—Commended for display of good taste in design, and excellence in workmanship.

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266. **E. J. States, Boston, Mass., U. S.**

INFANTS' DRESSES AND EMBROIDERY.

Report.—Commended for good style and workmanship.

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267. **Kursheedt & Co., New York, N. Y., U. S.**

EMBROIDERIES, PUFFINGS, PLAITINGS, AND FLUTINGS.

Report.—Commended for skill, taste, and novelty. All exhibited goods are well made and of tasteful pattern, especially in ruffling, and ruches, as well as in ladies' collars and cuffs.

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268. **Brooklyn Female Employment Society, Brooklyn, N. Y., U. S.**

EMBROIDERY.

Report.—Commended for excellence in style and very good workmanship.

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269. **St. Rose's Orphan Asylum, Milwaukee, Wis., U. S.**

EMBROIDERY.

Report.—Commended for great display of taste in design and for fine workmanship.

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270. **C. & E. Harding, Illington Lodge, Norfolk, England.**

EMBROIDERY.

Report.—Commended for excellent taste, skill, and workmanship.

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271. **Simon, May, & Co., Nottingham, England.**

EMBROIDERED CURTAINS, MANTLES, AND VESTIBULE LACES.

Report.—Embroidered curtains, mantles, and vestibule laces, of very tasteful design and superior workmanship. Also embroideries with fast warranted colors.

272. **Grey Nuns of Montreal, Montreal, Canada.**

EMBROIDERED HANDKERCHIEF.

Report.—Commended for great skill in workmanship.

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273. **Hochelaga Convent, Montreal, Canada.**

EMBROIDERY,—PRIESTS' VESTMENTS.

Report.—Commended for great excellence in design and workmanship.

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274. **Convent Jesus and Mary, Quebec, Canada.**

EMBROIDERY,—PRIESTS' VESTMENTS.

Report.—Commended for great excellence in design and workmanship.

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275. **Julius Reichel, Warsaw, Russia.**

EMBROIDERED SHIRTS AND CRAVATS, PRINTING IN COLORS ON LINEN.

Report.—Commended for novelty and good finish.

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276. **K. Hodjaef, St. Petersburg, Russia.**

SILVER AND GILT EMBROIDERED JACKETS FOR LADIES; ALSO EMBROIDERIES IN PERSIAN AND TURKISH STYLES.

Report.—Commended for first-rate execution, originality, and taste.

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277. **Julius Florand, St. Petersburg, Russia.**

EMBROIDERIES.

Report.—Silk embroideries on flannel; point lace, hand-made embroideries; handkerchiefs, shirts, and collarettes of very good make; commended for elegant style and quality.

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278. **M. Komarof, St. Petersburg, Russia.**

GILT AND SILVER EMBROIDERIES, MADE BY HAND ON LINEN, CLOTH, SILK, AND LEATHER.

Report.—Commended for very fine, tasteful design and superior skill.

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279. **Kretof, Orenburg, Russia.**

EMBROIDERIES, MADE BY HAND ON CLOTH, IN TURKISH STYLE.

Report.—Trimmings and hosiery for ladies, very well made. Commended for good taste and fine work.

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280. **Meunier & Co., Paris, France.**

EMBROIDERED TOWELS, CURTAINS, PAUNEAUX OR PORTIÈRES.

Report.—Embroideries made by hand, after old style, in fast warranted colors; great variety and novelty in patterns; curtains with embroidered colors on applicated muslin, strong, well made, splendid shading of colors, beautiful designs, at comparatively small cost. Commended for high skill, taste, and fine workmanship.

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281. **Marquis of Talhouët-Roy, Paris, France.**

HAND-MADE SILK EMBROIDERIES OF BLACK SILK IN JAPANESE STYLE.

Report.—Well-variegated colors, elegant style, high taste, and fine workmanship.

282. **Ch. Babey, Calais, France.**

EMBROIDERED CURTAINS MADE BY MACHINERY, FAST WARRANTED COLORS.

Report.—Commended for handsome combination of colors, novelty, and nice drawings; well shaded.

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283. **I. A. Vessière-Paulin, Paris, France.**

HAND-MADE EMBROIDERIES IN CHILDREN'S CLOTHING.

Report.—Well made; tasteful and elegant patterns; fine workmanship.

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284. **Fow Loong, Canton, China.**

EMBROIDERIES ON SILK, MOUNTED IN SCREENS.

Report.—Embroideries on silk mounted in screens, of a magnificent design and original taste, superior workmanship, and fine shading in colors.

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285. **S. Nishimura, Kiyoto, Japan.**

EMBROIDERIES.

Report.—Fine display of embroideries on silk; rich colors, partly printed and partly embroidered. Commended for originality in taste and for cheapness.

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286. **Tanaka, Kiyoto, Japan.**

PICTURES IN SILK EMBROIDERIES.

Report.—Commended for very peculiar and original pictures in silk embroideries, original taste, high skill, and superior execution.

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287. **Provincial Foundling Asylum, Avila, Spain.**

EMBROIDERY.

Report.—Commended for good taste in design and workmanship.

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288. **Celedonia Guibelalde, Madrid, Spain.**

EMBROIDERED PICTURE OF KING ALFONSO XII.

Report.—Commended for artistic skill and taste.

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289. **Benita & Louisa Nin & Mañe, Barcelona, Spain.**

EMBROIDERY AND TATTING.

Report.—Commended for a high degree of excellence in taste and workmanship.

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290. **Female Asylum of Charity, Seville, Spain.**

EMBROIDERY, HANDKERCHIEF, AND CHILD'S SHIRT.

Report.—Commended for excellent taste and workmanship.

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291. **Theodora Dávila, Manila, Philippine Islands.**

EMBROIDERY.

Report.—Commended for excellent taste and very fine workmanship.

292. **Municipal School for Girls, Manila, Philippine Islands.**

EMBROIDERY.

Report.—Commended for high degree of excellence in design and workmanship.

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293. **Embroidery School for Women, Rio de Janeiro, Brazil.**

EMBROIDERY.

Report.—Commended for good taste and workmanship.

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294. **M. Hirschberg & Co., Eibenstock, Germany.**

EMBROIDERIES.

Report.—An assortment of good patterns of machine and hand-made embroideries and lace flowers for ladies' dress; also a tasteful white silk blond shawl.

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295. **Edward A. Richter, Vienna, Austria.**

EMBROIDERIES.

Report.—Variegated embroideries and working materials; great variety of colors; well done; fine, elegant taste; cheapness and workmanship.

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296. **Miss Cathrine Foyn, Christiania, Norway.**

EMBROIDERY ON WOOLEN CLOTH.

Report.—Commended for good workmanship and excellence in design.

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297. **Miss R. Sundt, Christiania, Norway.**

EMBROIDERY.

Report.—Commended for good taste and workmanship.

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298. **Christiania Drawing Office, Christiania, Norway.**

EMBROIDERY AND PATTERNS FOR EMBROIDERY.

Report.—Commended for high degree of excellence in design and execution.

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299. **Mrs. Mina Wasbö, Stavanger, Norway.**

EMBROIDERY.

Report.—Commended for excellence in design and colors.

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300. **Drawing School of the Board of Trade, St. Gallen, Switzerland.**

EMBROIDERIES.

Report.—This school, supported by the Board of Trade, and managed by the principal manufacturers, is a very important institution to sustain the progress of the embroiderers' industry. The curtains exhibited by the school are executed after the drawings of the scholars, and show the progress made.

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301. **Steiger & Co., Herisau, Switzerland.**

CURTAINS EMBROIDERED BY HAND ON MUSLIN.

Report.—Commended for tasteful drawings and reasonable prices.

302. **Basquin, Hector & Schweizer, St. Gallen, Switzerland.**

EMBROIDERIES.

Report.—Machine embroideries in cotton and linen of an important extent, great variety of very tasteful and well-worked patterns, especially in linen embroideries; nice samples of collars, cuffs, and under-garments for regular trade. Commended for quality and skill.

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303. **Bion & Tschumper, St. Gallen, Switzerland.**

EMBROIDERIES.

Report.—Mechanical embroideries for ladies' under-garments and dresses, cuffs, collars, etc. First-rate design and splendid workmanship in the patterns exhibited by this firm. Commended for design, cheapness, and workmanship.

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304. **Alder & Meyer, Herisau, Switzerland.**

EMBROIDERIES.

Report.—Embroidered trimmings made by machinery; very fair collection; patterns of good taste and nicely made.

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305. **Iklé Brothers, St. Gallen, Switzerland.**

EMBROIDERIES.

Report.—A fair assortment of mechanical embroideries, specialty of linen, silk, and woolen embroideries for ladies' dresses, application of silk on black necklace for ladies, and very good regular trade samples for under-garments, collars, cuffs, etc. Commended for skill and workmanship.

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306. **C. Stäheli-Wild & Co., St. Gallen, Switzerland.**

EMBROIDERIES.

Report.—The display shows a large and rich variety of hand-made and mechanical embroideries, especially ladies' dresses, silk robes, and costumes. Commended for tasteful patterns and fine finish.

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307. **Joel Thomas, Philadelphia, Pa., U. S.**

RUCHES, LADIES' AND INFANTS' CAPS, RUFFLINGS, AND COLLARETTES.

Report.—Commended for fitness and cheapness; two hundred various patterns; well made, and very moderate prices.

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308. **Miss Jeannie Whittemore, Charleston, S. C., U. S.**

WORSTED WORK—PICTURE OF GENERAL WASHINGTON.

Report.—Commended for excellence in skill and workmanship.

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309. **Employees of American Button-Hole Sewing-Machine Co., Philadelphia, Pa., U. S.**

SEWING-MACHINE WORK.

Report.—Commended for excellence of workmanship.

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310. **Lina Fuldner, Milwaukee, Wis., U. S.**

NEEDLE WORK.

Report.—Commended for artistic taste in design and great display of skill in execution.

311. **Bene, Creighton, & Co., New York, N. Y., U. S.**

OSTRICH FEATHERS.

Report.—Well-dyed and variegated feathers. Commended for cheapness, quality, color, and finish.

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312. **Mrs. Annie T. Auerbach, Troy, Ala., U. S.**

BED-SPREAD OF SATIN AND SILK CROCHET WORK.

Report.—Commended for novelty in design and excellent workmanship.

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313. **Working School of Village of Adare, under the Patronage of the Countess of Dunraven, Adare, County of Limerick, Ireland.**

NEEDLE WORK.

Report.—Commended for embroideries on lawn, executed by the members of her working school in the village of Adare, county of Limerick; well-made robes, insertions for dresses, and pin-cushion covers.

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314. **Mrs. De B. McDonald, Montreal, Canada.**

GOBELIN TAPESTRY.

Report.—Commended for great excellence in taste, skill, and workmanship.

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315. **Mrs. Sutcliffe, Halifax, Nova Scotia.**

NEEDLE WORK—"LAST SUPPER."

Report.—Commended for superior skill and workmanship.

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316. **The Misses Farrell, Halifax, Nova Scotia.**

FANCY WOOL WORK.

Report.—Commended for very good taste and great skill in execution.

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317. **Miss Park, Watertown, Canada.**

KNITTING AND TATTING.

Report.—Commended for great taste and skill in workmanship.

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318. **Alfred Bailey, Douai, France.**

TULLES AND GIMP FOR FURNITURE, LACE IMITATIONS.

Report.—Imitation of Valenciennes of good style; nice drawings; fine workmanship.

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319. **E. & C. Dieutegard, Paris, France.**

SILK AND WOOLEN TRIMMINGS FOR DRESSES AND FURNITURE.

Report.—Commended for large variety, elegant and tasteful patterns, good quality of material, and superior workmanship.

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320. **Government of Venezuela.**

ORNAMENTAL HAIR, FEATHER, AND NEEDLE WORK.

Report.—1. Representation of Washington, made of the hair of General Bolivar, Liberator of South America, and of several other generals; the property of General Guzman

Blanco; artist, Faustino Padron. Commended for originality of conception in preparation and treatment of material.

2. Collection of hammocks embroidered with feathers. Commended for brilliant effects produced by grouping in fringes gorgeously colored natural feathers of tropical birds.

3. Pin-cushion in needle work. Commended for its delicacy and beauty.

4. Embroidered handkerchiefs. Commended for the extraordinary fineness and delicacy of the needle work.

5. Basket with artificial flowers made of feathers. Commended for beauty of design and taste in composition of colors.

6. Handkerchiefs. Commended for delicate embroidery.

7. Gold embroidered saddle cloth furnished by G. Sprengle, Caracas. Commended for elegance and richness of fabric and of color, and for taste in design.

8. Two bouquets, one in a basket and the other in a pot of natural flowers, contributed by Wm. G. Boulton. Commended for exquisite beauty and brilliancy of color of flowers and foliage.

9. Wax fruit, seed, and flowers. Commended for utility in illustration.

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321. **Baroness de Surupy, Rio de Janeiro, Brazil.**

CROCHET WORK IN WORSTED YARN.

Report.—Commended for skill and taste displayed in design and combination of colors.

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322. **W. Schmidl's Sons, Vienna, Austria.**

HABERDASHERY, TRIMMINGS, SILK AND WOOLEN BRAIDS (HAND-MADE).

Report.—Great variety of trimmings; inside cotton, covered with silk. Commended for good taste in patterns and cheapness of prices.

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323. **John Blanzincic & Sons, Vienna, Austria.**

MILITARY TRIMMINGS.

Report.—Commended for good taste and workmanship.

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324. **Miss Anna Kretz, Christiania, Norway.**

NEEDLE WORK IN CLOTH AND FEATHERS.

Report.—Commended for novelty in design and excellence in workmanship.

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325. **J. M. Fyrwald, Stockholm, Sweden.**

MILITARY TRIMMINGS.

Report.—Commended for high quality.

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326. **Charlotta Bagge, Kramfors, Sweden.**

PILLOW CUSHION.

Report.—Commended for excellent taste and good workmanship.

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327. **Isler, Aloyse, & Co., Wildegg, Canton of Aargau, Switzerland.**

BRAIDS FOR HATS MADE OF HORSE HAIR AND IMITATION OF HORSE HAIR IN COTTON.

Report.—Commended for great variety, excellent make, and cheapness.

328. **W. A. Drown & Co., Philadelphia, Pa., U. S.**

UMBRELLAS AND PARASOLS, CUT AND COVERED WITH A SUPERIOR FITNESS, STICKS AND HANDLES OF THEIR OWN MAKE.

Report.—Commended for excellent finish and careful selection of good material.

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329. **Joseph F. Tobin, New York, N. Y., U. S.**

WHALEBONE GOODS.

Report.—Commended for excellence in preparing the whalebones for all purposes intended, and canes, perfect workmanship of his products.

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330. **Heiter & Gans, New York, N. Y., U. S.**

UMBRELLAS AND PARASOLS WITH AUTOMATIC RUNNER.

Report.—Commended for very good improvement, convenient and useful; also for invention, and quality.

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331. **Thos. Miller, New York, N. Y., U. S.**

UMBRELLAS.

Report.—Commended for a high degree of excellence in style, and special regard to strength combined with light weight.

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332. **Ellis, Knapp, & Co., New York, N. Y., U. S.**

UMBRELLAS AND PARASOLS WITH BURGLAR-PROOF RUNNER.

Report.—Commended for superior mechanism, workmanship, and novelty.

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333. **Glendenning & Truitt, Philadelphia, Pa., U. S.**

WHIPS AND VARIOUS RIDING ARTICLES.

Report.—Commended for quality, skill, and fine workmanship.

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334. **Swain & Adency, London, England.**

WHIPS.

Report.—All the articles exhibited are very well made. Especial attention may be called to the whips, which are first-rate in taste, quality, and fitness. Commended for quality and fine make.

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335. **Davis & Wilson, Birmingham, England.**

MOUNTING FOR WALKING STICKS, WHIPS, AND UMBRELLAS.

Report.—A fine set of superior mountings for walking sticks, whips, and umbrellas; perfect execution; great variety of styles; and at very moderate prices.

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336. **William Henry Martin, London, England.**

UMBRELLAS, WALKING STICKS, AND WHIPS.

Report.—A first-rate assortment of umbrellas, walking sticks, and whips. The umbrellas especially are of the best and finest execution, and are commended as standard in quality and workmanship.

337. **Antonio Noailles, Zaragoza, Spain.**

WALKING CANES OF DOMESTIC WOOD.

Report.—Very finely carved and finished. Commended for tasteful designs and originality.

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338. **Manuel Antonio Diogo, Oporto, Portugal.**

SILK UMBRELLAS, WITH IVORY HANDLES.

Report.—Very good work; extremely moderate prices.

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339. **Mustapha Ousta, Broussa, Turkey.**

EBONY CANE, INLAID WITH SILVER.

Report.—Commended for very fine work, tasteful designs, and first-rate execution.

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340. **Righini Brothers, Turin, Italy.**

UMBRELLAS AND PARASOLS.

Report.—Umbrellas and parasols, especially for traveling. Commended for ingenuity, good finish, cheapness, and novelty.

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341. **Berlin Umbrella Factory (Joseph Sachs & Co.), Berlin, Germany.**

UMBRELLAS.

Report.—Commended for good shape, ingenious mechanism, and extraordinary cheapness.

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342. **Althof, Bergmann, & Co., New York, N. Y., U. S.**

MECHANICAL TOYS.

Report.—Commended for very ingenious mechanisms, imitating very naturally the motion of the human body, originality, fitness, and cheapness.

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343. **Robert Nickle, Rochester, N. Y., U. S.**

MAGICAL APPARATUS AND TOYS.

Report.—Commended for quality, skill, and fine workmanship.

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344. **W. C. Goodwin, New Haven, Conn., U. S.**

TOY MONEY-SAFES.

Report.—Commended for novelty in design and construction, recording each coin as it is dropped in.

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345. **Eugene Begg, Paterson, N. J., U. S.**

MODEL LOCOMOTIVE, TRAIN OF PASSENGER CARS, AND TRACK.

Report.—The locomotive is driven by the flame of an alcoholic lamp. The train includes a tender and Pullman and ordinary passenger cars, supported on two four-wheel trucks. The track is a long oval, of twenty-five feet in length. The locomotive and cars are richly and tastefully finished and of substantial construction. Commended for elegance of design, and as being admirably suited for purposes of illustration and instruction.

346. **Mrs. R. E. Jenkins, Bordentown, N. J., U. S.**

DOLLS' SHOES.

Report.—Commended for good finish.

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347. **Pope Manufacturing Co., Boston, Mass., U. S.**

RIFLE AIR-PISTOL.

Report.—Commended for ingenious mechanism of a cheap and serviceable instrument for exercise and amusement, also for beginners in practicing marksmanship; also for originality and novelty, as well as for the fitness.

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348. **W. B. Carr & Co., Brooklyn, N. Y., U. S.**

BASE BALLS.

Report.—Well-made base balls.

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349. **L. H. Mahn, Jamaica Plains, Mass., U. S.**

BASE BALLS.

Report.—Commended as very well sewed and of good material and design.

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350. **J. D. Shibe & Co., Philadelphia, Pa., U. S.**

BASE BALLS.

Report.—Well-constructed triple ball, well sewed.

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351. **Peck & Snyder, New York, N. Y., U. S.**

BASE BALL SUPPLIES.

Report.—Suits well made.

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352. **Reach & Johnston, Philadelphia, Pa., U. S.**

BASE BALL AND SPORTING GOODS.

Report.—Suits well made and of tasteful design.

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353. **Z. Iwai, Naro, Yamato, Japan.**

TOYS.

Report.—The bodies of animals are well executed and of high finish. Commended for originality and splendid finish.

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354. **Faivre, Paris, France.**

GREAT VARIETY OF TIN TOYS.

Report.—Very well fitted up. Commended for cheapness, skill, and workmanship.

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355. **F. F. Jumeau, Paris, France.**

DOLLS' HEADS AND BODIES.

Report.—A fine collection, dressed in a most fashionable style; the heads of the finest imitation, superior taste, and excellent workmanship in mechanical construction.

356. **Trufy, Paris, France.**

FINE MECHANICAL TOYS.

Report.—Commended for very good execution and combination of movements, great variety, skill, and workmanship.

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357. **I. A. Issmayer, Nuremberg, Germany.**

TIN TOYS.

Report.—Commended for improvement and introduction of novelties in the assortment of tin toys, great variety, skill, and cheapness.

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358. **L. Uebelacker, Nuremberg, Germany.**

MAGNETIC TOYS.

Report.—Commended for large variety, good workmanship, and very moderate prices.

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359. **J. D. Oehm & Sons, Grunhainichen, Germany.**

WOODEN TOYS.

Report.—Regular trade ware of a very popular style and extraordinary cheapness.

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360. **Cuno & Otto Dressel, Sonneberg, Germany.**

DOLL LADIES AND HEADS.

Report.—Commended for great variety, solid material, and cheapness, especially heads with good-looking features.

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361. **L. Schünemann, Magdeburg, Germany.**

DRESSED DOLL LADIES.

Report.—Fine and various dresses. Commended for good workmanship and great variety of patterns.

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362. **Heinrich Sichling, Nuremberg, Germany.**

DRESSED DOLLS (FOR WHOLESALE TRADE).

Report.—Commended as well finished, of various patterns, and great cheapness.

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363. **Ernst Plank, Nuremberg, Germany.**

MAGIC LANTERNS, MODELS OF STEAM ENGINES, AND TINNED WORK.

Report.—Commended for good finish and fine workmanship.

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364. **Barth & Wagner, Rodach, Germany.**

TOYS.

Report.—Performing animals, very well imitated from nature.
Good work, at very low prices.

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365. **J. G. Normann, Nuremberg, Germany.**

VARIETY OF TIN CAST WARE IN FANCY SOLDIERS OF ALL COUNTRIES

Report.—Commended for good patterns, very moderate prices, fitness, and workmanship.

366. **C. Baudenbacher, Nuremberg, Germany.**

MAGICAL APPARATUS.

Report.—Commended for ingenious combination of mechanism, large variety in patterns, elegant appearance, and novelty.

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367. **Miss Elizabeth Sahler, Kingston City, N. Y., U. S.**

WAX FLOWERS.

Report.—Commended for artistic taste and skill, especially in autumn leaves.

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368. **Mrs. J. H. Martin, Philadelphia, Pa., U. S.**

FEATHER FLOWERS.

Report.—Commended for elegant style, well-shaded colors, taste, and workmanship.

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369. **Miss A. De Etta Bloodgood, New York, N. Y., U. S.**

WAX FLOWERS, LEAVES, SHELLS, AND FRUIT.

Report.—Commended in that the exhibitor excels in the natural effects produced in variegating and in shading of colors, especially of fruit and flowers; also for perfection of taste and accuracy in imitating the structure of flowers.

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370. **Birge & Berg, Philadelphia, Pa., U. S.**

ARTIFICIAL FLOWERS OF VARIOUS COLORS AND SHADES.

Report.—Commended in that the exhibitors show high progress in regard to fine workmanship; for natural effect produced, superior finish, and taste in arrangement; for a new industry, as this one is in the United States; also for their patented cartoons, which give a better appearance to flowers, and keep them in good state after packing.

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371. **Bender & Philips, Hoboken, N. J., U. S.**

SHEET WAX AND WAX-FLOWER MATERIALS.

Report.—Commended for skill and good workmanship.

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372. **General Hospital, Quebec, Canada.**

ARTIFICIAL FLOWERS.

Report.—Commended for a great display of artistic taste and skill.

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373. **Madame F. de Richelieu, Windsor, Victoria, Australia.**

FLOWERS MADE FROM FISH SCALES.

Report.—Flowers made from fish scales, very nicely executed, and hand-made. Commended for artistical workmanship and skill.

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374. **L. Delivre, Paris, France.**

ARTIFICIAL FLOWERS.

Report.—Commended for good finish, taste, and workmanship, especially the roses, which are very like nature.

375. **L. Hielard & Co., Paris, France.**

ARTIFICIAL FLOWERS AND OSTRICH FEATHERS.

Report.—Commended for great and rich variety, elegant styles and finish, taste, skill, and workmanship.

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376. **Gosse-Perier, Paris, France.**

ARTIFICIAL FIELD FLOWERS AND VIOLETS.

Report.—Superior in the imitation of colors and structure, good taste, and low prices.

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377. **General Guzman Blanco, President of Venezuela.**

BOUQUETS MADE OF NATURAL FEATHERS.

Report.—Commended for taste and skill as shown in remarkably gorgeous and life-like effects, by combinations of brilliant and variously colored feathers in natural hues, to produce, with little other aid than that of the scissors, numerous flowers of great richness and beauty.

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378. **Guilhermina d'Oliveira Pinho, Ponta Delgado, Portugal.**

FEATHER FLOWERS.

Report.—Commended for excellent taste, nice material, and fine workmanship.

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379. **Maria Magdalena de Souza, Ponta Delgado, Portugal.**

ARTIFICIAL FLOWERS.

Report.—Commended for very fine taste, good execution, and originality displayed in the manufacture of artificial flowers from the pith of the fig-tree and from stearine.

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380. **Mrs. Silveira de Souza, Sta. Catharina, Brazil.**

FLOWERS MADE FROM FISH SCALES AND EGG SHELLS.

Report.—Flowers made from fish scales and egg shells. Commended for very fine taste, high skill, and originality.

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381. **Misses M. & E. Natté, Rio de Janeiro, Brazil.**

FLOWERS MADE FROM FEATHERS.

Report.—Great variety of flowers entirely made from feathers; very well shaded in national colors; fine structure and high taste.

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382. **Miss Antonia Alcocer, City of Mexico, Mexico.**

WAX FLOWERS AND FRUITS.

Report.—Commended for good style and excellent imitation of nature, skill, and workmanship.

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383. **Miss M. Pensado, Jalapa, Mexico.**

FLOWERS MADE FROM HORN SHAVINGS.

Report.—Made in a very splendid manner, fine workmanship and taste.

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384. **Countess Pauline Baudissin, Vienna, Austria.**

ARTIFICIAL FLOWERS.

Report.—Commended for natural appearance, well-variegated colors, skill, taste, and workmanship.

385. **Miss Pauline Holst, Drammen, Norway.**

ARTIFICIAL FLOWERS.

Report.—Commended for the skill and artistic taste displayed.

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386. **New York Button Co., Brooklyn, N. Y., U. S.**

METALLIC AND COVERED BUTTONS.

Report.—Commended for utility, quality, and cheapness.

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387. **Scovill Manufacturing Co., Waterbury, Conn., U. S.**

METALLIC BUTTONS FOR MILITARY, ETC., FOR FOREIGN AND DOMESTIC MARKETS, ALSO LASTING AND OTHER COVERED BUTTONS.

Report.—Commended for excellence of quality, taste, and variety in designs.

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388. **National Button Co., Easthampton, Mass., U. S.**

IVORY AND CLOTH BUTTONS.

Report.—Commended for quality, durability, and cheapness; strong and well made.

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389. **Porter Brothers & Co., New York, N. Y., U. S.**

METALLIC PANTALOON BUTTONS.

Report.—Commended for novelty, utility, and economy.

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390. **Waterbury Button Co., Waterbury, Conn., U. S.**

LARGE VARIETY OF PATTERNS, METALLIC AND COVERED BUTTONS.

Report.—Commended for originality of design; fine goods in every respect; a large and important business; variety in design.

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391. **James Fenton, Birmingham, England.**

PEARL BUTTONS.

Report.—The pearl buttons for shirts exhibited by this firm are first-rate in quality and workmanship; an excellent display.

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392. **F. Bapterosses, Paris, France.**

BUTTONS AND PEARLS OF EVERY SIZE, MANUFACTURED ON A VERY LARGE SCALE.

Report.—Commended for superior finish, novelty, design, and cheapness.

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393. **P. Feu & Sons, Barcelona, Spain.**

METALLIC BUTTONS.

Report.—Great and handsome variety. Commended for good style, high finish, and taste.

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394. **H. Schalck, Lisbon, Portugal.**

BUTTONS, AND HOOKS AND EYES.

Report.—Commended for good workmanship and low prices.

395. **Goncalves Ribas & Co., Oporto, Portugal.**

BUTTONS.

Report.—Great variety of patterns; silk with glass metal, cotton lasting. Commended for skill and cheapness.

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396. **Eduard Peine, Hamburg, Germany.**

IVORY AND TORTOISE-SHELL SLEEVE BUTTONS.

Report.—Commended for very good patterns, large assortment, good finish, and cheapness.

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397. **Turner's Sample Office, Vienna, Austria.**

BUTTONS.

Report.—Tasteful and cheap sleeve buttons, of mother of pearl and ivory. Commended for fine workmanship and taste.

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398. **Franz Anton Puschner, Tyssa, Bohemia, Austria.**

BUTTONS.

Report.—Buttons in metal in great variety; extraordinary cheapness.

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399. **Collective Exhibit of Vienna Pearl Button Manufacturers, Vienna, Austria: Vincenz Schädelbaur, Josef Jaruschka, Ignaz Krehan, Wilhelm Schwan, Adalbert Wittek, Karl Steindl, Peter Wielander.**

PEARL BUTTONS.

Report.—All the exhibitors show a display of mother of pearl buttons, nearly all in the same style. After our judgment, we think it would be an injustice to select any one of them.

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400. **Oakville Co., Waterbury, Conn., U. S.**

PINS OF ALL SIZES.

Report.—Commended for quality and cheapness, especial excellence in the finish of the points.

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401. **I. W. Stewart, New York, N. Y., U. S.**

VARIETY OF NURSERY AND SHAWL PINS.

Report.—Commended for good workmanship and finish, and cheapness.

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402. **Kirby, Beard, & Co., Birmingham, England.**

NEEDLES AND PINS.

Report.—Commended for the excellent quality and fitness of the exhibited products.

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403. **Henry Millward & Sons, Redditch, England.**

NEEDLES.

Report.—All kinds of needles, and similar articles, of first-rate quality and fine workmanship.

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404. **David Evans, Redditch, England.**

NEEDLES.

Report.—Sewing needles of various sizes and kinds, including sewing-machine needles, showing the various stages of manufacture from the original steel wire to the finished product. An instructive exhibit of products of standard excellence.

405. **James Smith & Son, Astwood Bank, near Redditch, England.**

HAND-SEWING NEEDLES.

Report.—Large exhibit of hand-sewing needles, which are of excellent finish, very well tempered, and elastic, the points sharp and well tapered. Commended for quality, skill, and fitness in use.

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406. **Nax, Kuhn, & Silberman, Philadelphia, Pa., U. S.**

TOBACCO PIPES.

Report.—Tobacco pipes nicely carved on wood, good finish and domestic work. Commended for quality, design, and style.

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407. **Fred. Julius Kaldenberg, New York, N. Y., U. S.**

PIPES OF MEERSCHAUM AND AMBER.

Report.—Commended for great perfection in style, superior workmanship, and introduction of a new domestic industry.

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408. **Wm. Demuth & Co., New York, N. Y., U. S.**

BRIER AND APPLE WOOD PIPES.

Report.—Commended for popular style and cheapness.

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409. **Bernstein Brothers, Ostrolenka, Lomza, Russia.**

AMBER JEWELRY AND SMOKERS' ARTICLES.

Report.—Commended for very good finish, fine material, and reasonable prices.

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410. **Baudier, Ulbrich, & Co., Paris, France.**

MEERSCHAUM AND BRIER WOOD PIPES.

Report.—Commended for very popular style, good finish, and first-rate material.

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411. **Widow Hasslauer & de Champeaux, Givet, France.**

CELEBRATED GAMBIER CLAY PIPES.

Report.—Commended for a complete assortment, very popular style, excellent quality, and good material.

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412. **Gebhard Ott, Nuremberg, Germany.**

BRIER WOOD PIPES.

Report.—Commended for excellent style and finish, great variety of shapes, and moderate prices.

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413. **Arnold Trebitsch, Vienna, Austria.**

SMOKERS' ARTICLES.

Report.—Exhibit of smokers' articles, in imitation of meerschaum and amber. Commended for great perfection, good imitation, extraordinary cheapness.

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414. **Franz Heiss, Vienna, Austria.**

SMOKERS' ARTICLES, IN GENUINE MEERSCHAUM AND AMBER.

Report.—An immense assortment of patterns, very finely carved. Commended for good style, quality, workmanship, and cheapness.

415. **Hermann Kemperling, Vienna, Austria.**

SMOKERS' ARTICLES, OF CHERRY WOOD.

Report.—Commended for good qualities of work, very low prices, and large and handsome variety.

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416. **P. Goedwaagen, Gouda, Netherlands.**

CLAY PIPES.

Report.—Clay pipes in a very large assortment, good material, popular style, very cheap.

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417. **F. Armstrong, Bridgeport, Conn., U. S.**

DUPLEX VENTILATED METALLIC GARTERS AND ARMLETS.

Report.—Commended for novelty of patterns and durability.

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418. **Independent Comb Co., Wappinger Falls, N. Y., U. S.**

LADIES' HORN AND RUBBER COMBS, DRESSING COMBS, PIPE STEMS, AND BITS.

Report.—Commended for skill and workmanship, and especially for variety of style of rubber pipe stems and for cheapness.

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419. **S. Harris & Sons' Manufacturing Co., Clinton, Mass., U. S.**

HORN COMBS.

Report.—Commended for large variety and general good finish.

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420. **W. H. Noyes, Newburyport, Mass., U. S.**

HAND-MADE HORN COMBS AND BARBERS' DRESSING COMBS.

Report.—Commended for quality and fitness.

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421. **J. S. Adams & Co., Providence, R. I., U. S.**

TORTOISE-SHELL JEWELRY AND COMBS.

Report.—Commended for good design and finish and tasteful style of workmanship.

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422. **Henry Carlisle & Son, Philadelphia, Pa., U. S.**

TORTOISE-SHELL AND HORN COMBS.

Report.—Commended for superior fitness and workmanship, especially in the careful selection of material.

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423. **Pratt, Read, & Co., Deep River, Conn., U. S.**

IVORY COMBS.

Report.—Commended for superior excellence of work and finish, and for general adaptation to intended use.

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424. **D. S. Spaulding, Mansfield, Mass., U. S.**

TORTOISE-SHELL JEWELRY, BACK-COMBS, AND FANCY GOODS.

Report.—Excels especially in belts and necklaces. Commended for style and finish.

425. **Celluloid Manufacturing Co., Newark, N. J., U. S.**

TOILET BRUSHES; JEWELRY MADE FROM CELLULOID.

Report.—Commended for novelty of material used, and very fine finish.

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426. **Joslin Palmer & Williams, New York, N. Y., U. S.**

HORN JEWELRY.

Report.—Commended for taste in design and general excellence of finish.

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427. **Lewisohn Brothers, New York, N. Y., U. S.**

HUMAN HAIR.

Report.—A fine exhibit, excellently prepared, showing skill and workmanship.

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428. **Sarah E. Bonney, Sterling, Mass., U. S.**

FEATHER FANS.

Report.—Commended for originality, good taste and finish, and fine workmanship.

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429. **Fred. W. Ansley, St. Augustine, Fla., U. S.**

JEWELRY OF NATIVE FLORIDA MATERIAL, AND ESPECIALLY OF THE SEA BEAN AND OF ARTIFICIAL FLOWERS MADE OF FEATHERS.

Report.—The flowers are very tastefully variegated in colors and shades. Commended for skill and fitness.

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430. **Emil W. Moutoux, New York, N. Y., U. S.**

HAIR PICTURES AND DEVICES FOR BREASTPINS, OF ORNAMENTAL DESIGN AND TASTEFUL STYLE.

Report.—Commended for skill, taste, and workmanship.

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431. **F. Grote & Co., New York, N. Y., U. S.**

CARVED AND TURNED IVORY FOR TOILET AND TRAVELING USE.

Report.—Commended for fitness and workmanship, especially for superior quality of billiard balls.

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432. **J. S. Cummings & Co., Philadelphia, Pa., U. S.**

SILK NECKWEAR.

Report.—Commended for variety in design, quality of material, and good workmanship.

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433. **Harriet F. Bailey, Walworth, Wisconsin, U. S.**

ORNAMENTAL PAPER CUTTING.

Report.—Commended for beauty of design and perfection of workmanship; worthy of special mention for the artistic ability exhibited.

434. Emil Wahl, Philadelphia, Pa., U. S.

GREAT VARIETY OF FANCY BONE WORK, IN CROCHET NEEDLES AND BUTTONS.

Report.—Commended in that the specialty of buttons for common use are of good quality and at very low prices.

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435. National Suspender Co., New York, N. Y., U. S.

SUSPENDERS.

Report.—Commended for originality in the production of several designs upon one machine at once; of good quality and workmanship.

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436. A. L. Willis, Philadelphia, Pa., U. S.

ICE CREEPER AND SANDAL COMBINED.

Report.—Attachment for the shoes, to be used in walking upon ice; highly commended for safety and utility.

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437. Charles Jeffreys, London, England.

SHOW CASES AND JEWELRY BOXES.

Report.—1. Dust-excluding show cases.

2. Velvet-lined and covered jewelry boxes to accompany articles sold.

3. Cases for shop display.

All of convenient and tasteful devices, admirably suited to the purposes intended.

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438. Welsh, Margetson, & Co., London, England.

SCARFS AND NECKTIES.

Report.—Commended for variety, good quality, and good work.

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439. Crown Perfumery Co., London, England.

BUFFALO HORN COMBS.

Report.—Commended for high degree of excellence in quality, style, and general finish.

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440. J. Johnson & Co., London, England.

SHELL BOXES.

Report.—A good variety of shell boxes, in a very tasteful and new style, and in the very perfect way of preparing shells. Commended for the cheapness of goods.

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441. Miss Lizzie Farquharson, Whitby, Canada.

PAINTING ON VELVET, DESIGNS FOR PAINTING.

Report.—Commended for artistic taste and skill in designs.

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442. Henry Steiner, Adelaide, South Australia, Australia.

SILVER-MOUNTED EMU VASES AND ORNAMENTS.

Report.—Silver-mounted emu vases and ornaments of good make and original taste, although damaged by shipwreck. Commended for taste and originality.

443. **Ford Brothers, Melbourne, Victoria, Australia.**

PITH SUNSHADES FOR HORSES.

Report.—The pith sunshades for horses are of a very useful, original, and practical form to protect horses from the heat of the sun. Commended for the originality and utility of this improvement.

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444. **Mrs. Young, Hawaii.**

WREATH OF MOSSES AND SHELLS.

Report.—A wreath of mosses and shells, of fine execution, taste, and workmanship.

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445. **Augustus Stroem, St. Petersburg, Russia.**

FRAMES FOR PHOTOGRAPHS AND BRONZE MIRRORS.

Report.—Commended for very fine work, tasteful execution, and excellent material.

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446. **E. Cléray, Paris, France.**

FANCY TORTOISE-SHELL WARE, GLOVE BOXES AND TOILET ADORNMENTS.

Report.—Commended for first-rate material, taste, and workmanship.

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447. **H. Didout & Son, Paris, France.**

CLASPS FOR POCKET BOOKS, PURSES, AND CIGAR CASES.

Report.—Great variety; well made; good adaptation; extraordinary cheapness.

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448. **Alexandre, Paris, France.**

FANS.

Report.—A nice display of fans, of the most elegant style, in ivory, shell, and tortoise-shell, with very fine pictures on silk. Commended for taste, fine finish, and skill.

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449. **V. C. Voisin, Paris, France.**

CRAVAT CLASPS AND PINS OF EVERY SIZE.

Report.—Commended for great variety, good adaptation, fitness, skill, and cheapness.

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450. **F. Girondeau, Paris, France.**

FANCY BRONZE BOXES, WITH ENAMEL.

Report.—Commended for great variety, tasteful design and color, elegant style, and very moderate prices.

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451. **Alexis Musset & Co., Paris, France.**

WIGS AND DISPLAY OF HUMAN HAIR IN VARIOUS COLORS.

Report.—Well made; fine workmanship, and good colors.

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452. **Association for Women's Work, Kiyoto, Japan.**

VARIETY OF WOMEN'S WORK.

Report.—This association, having been in existence but a few years, is commended for having admirably succeeded in producing very good work.

453. **First Japanese Manufacturing and Trading Co., Tokio, Japan.**

CIGAR AND CARD CASES, AND MATCH BOXES.

Report.—Commended for fine workmanship, elegant finish, and comparatively cheap prices.

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454. **Princess Nabeschima, Yeddo, Japan.**

BOX.

Report.—A beautiful box, partly woven, partly worked; colors handsomely blended; fine workmanship; very good taste.

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455. **Ch. Minoda, Tokio, Japan.**

BOXES, BOOKCASES, FANS, AND PIPES.

Report.—Commended for fine workmanship and elegant finish in wooden work and shell articles.

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456. **S. Mochiami & Co., Kiyoto, Japan.**

FANS OF IVORY, WOOD, AND SHELL, WITH VERY FINE PICTURES.

Report.—Commended for elegant style, skill, and workmanship.

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457. **Kimura & Sumu, Kiyoto, Japan.**

FANS.

Report.—Embroidering in elegant style, and pictures for fans, of first-rate execution. Commended for high skill, and novelty.

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458. **Ho. A. Ching, Canton, China.**

CARVED IVORY FANS.

Report.—A nice display of carved ivory fans. Commended for exquisite quality, fine carvings, and low prices.

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459. **Leen Shing, Canton, China.**

FANS.

Report.—Fans, lacquered wood, and ivory, both of a first-rate finish, taste, and originality.

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460. **Yut Shing, Canton, China.**

LACQUERED FANS.

Report.—Lacquered wooden fans of the most elegant style and finest lacquer. Commended for high workmanship and fine finish.

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461. **Pantaleon de la Peña, Madrid, Spain.**

HUMAN HAIR AND WIGS.

Report.—Commended for fine execution, good material, and great skill.

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462. **Massaguer & Lledo, Barcelona, Spain.**

PAPER AND SILK FANS IN EVERY QUALITY AND STYLE.

Report.—Medium quality of good workmanship and at low prices.

463. **Alejandro Sans, Valencia, Spain.**

FANS OF PAPER AND WOOD.

Report.—Very popular style; well finished; extraordinary cheapness.

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464. **Antonia Salvi & Son, Barcelona, Spain.**

DRESS COMBS OF SHELL, HORN, AND BUFFALO.

Report.—Very well made, good material, fine workmanship.

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465. **S. W. Dabney, Fayal, Azores Islands.**

PICTURE FROM PITH OF FIG-TREE.

Report.—Commended for elegant design and first-rate workmanship.

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466. **N. Bourgeois, Buenos Ayres, Argentine Republic.**

HAIR PICTURE AND CHAINS MADE FROM HUMAN HAIR.

Report.—Hair picture and chains made from human hair, well finished. Commended for good taste and workmanship.

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467. **Luigi Olivieri, Venice, Italy.**

FANCY ARTICLES.

Report.—Fancy articles in mosaic, bonbonnières, vases; also necklaces and bracelets from blown and worked glass, shell jewelry of splendid finish. Commended for good taste and cheapness.

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468. **Mariano Labriola, Naples, Italy.**

TORTOISE-SHELL WORKS.

Report.—Tortoise-shell works in an excellent style. Commended for first-rate material and workmanship, exquisite taste, and finish.

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469. **Schlenk & Lutzenberger, Nuremberg, Germany.**

COMBS, HORN AND IMITATION OF TORTOISE-SHELL.

Report.—Commended for very good finish and very low prices.

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470. **Gottfried Probst, Nuremberg, Germany.**

COMBS OF BUFFALO-HORN AND IMITATION SHELL.

Report.—Commended for good workmanship, fine shapes, and cheapness.

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471. **Jean Schlegel, Nuremberg, Germany.**

ARTICLES OF TORTOISE-SHELL INLAID WITH GOLD.

Report.—Commended for high finish, novelty, and fine workmanship.

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472. **Heinr. Ad. Meyer, Hamburg, Germany.**

IVORY GOODS.

Report.—Commended for perfection in carving and finish, excellent material, and superior workmanship.

473. **Adalbert Hawsky, Leipsic, Germany.**

PAPER BALLOONS AND LANTERNS FOR ILLUMINATIONS.

Report.—Commended for large variety, tasteful patterns, and cheapness.

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474. **M. Krauliz, Vienna, Austria.**

FRAMES FOR PHOTOGRAPHIC CARDS.

Report.—Commended for large variety, tasteful patterns, and very cheap prices.

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475. **Clemens Lux, Vienna, Austria.**

FANCY BRONZE GOODS.

Report.—Commended for the fine taste of plain goods of an excellent finish.

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476. **Franz Bergmann, Vienna, Austria.**

BRONZE ARTICLES.

Report.—Commended for high finish, great variety, and good taste.

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477. **B. Heller's Sons, Yeplitz, Austria.**

BRONZE AND BONE JEWELRY.

Report.—A large assortment of patterns, all of good quality and new style.

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478. **John Kuzel & C. Jankowsky, Vienna, Austria.**

TURNERS' ARTICLES (WOOD MOUNTED WITH BRONZE).

Report.—A nice display of various patterns for different uses. Commended for good style, novelty, fine workmanship, and cheapness.

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479. **John Urnann, Tiefenbach, Austria.**

PAPER WEIGHTS AND INKSTANDS, MADE FROM CRYSTAL GLASS.

Report.—Commended for excellent quality, fine workmanship, and low prices.

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480. **Gustav Lerl & Sons, Vienna, Austria.**

BRONZE JEWELRY (ROCOCO WITH STONES).

Report.—Commended for fine workmanship, good patterns, and novelty.

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481. **John Zekert, Meistersdorf, Austria.**

CRYSTAL GLASSWARE, MOUNTED WITH BRONZE.

Report.—Crystal glassware, mounted with bronze. Commended for superior taste, extraordinary cheapness, and first-rate workmanship.

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482. **Franz Wagner, Meistersdorf, Austria.**

CRYSTAL GLASS AND BRONZE WARE.

Report.—Crystal glass and bronze ware of the highest taste and finest finish.

483. **Josef Osterritter, Vienna, Austria.**

FANS.

Report.—Fans of shell, tortoise-shell, ivory, and leather, with and without feathers. Commended for fine taste, fine combination, first-rate material, and workmanship; also low prices.

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484. **George Danberger, Vienna, Austria.**

BRONZE.

Report.—Bronze fancy articles in great variety, style, and cheapness.

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485. **A. F. Bechmann, Vienna, Austria.**

FANCY BRONZE WARE.

Report.—Fancy bronze ware of the highest style. Commended for very fine taste, handsome enamel, splendid workmanship, and finish.

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486. **Franz Beihl, Vienna, Austria.**

BRONZE FANCY GOODS.

Report.—Bronze fancy goods in various patterns. Commended for fair style and cheapness.

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487. **Josef Frank, Vienna, Austria.**

BRONZE WARE.

Report.—Bronze ware of nice design, tasteful variety, and at very moderate prices.

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488. **Dziedzinski & Hanusch, Vienna, Austria.**

BRONZE GOODS.

Report.—Commended for superior style, finest workmanship, and excellent taste, and for well-selected materials.

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489. **Anton Bohm, Vienna, Austria.**

BRONZE WARE.

Report.—Bronze ware in religious styles. Commended for tasteful execution, good design, and finish.

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490. **Johann Bambula, Vienna, Austria.**

FRAMES FOR FANCY LEATHER GOODS.

Report.—Frames for fancy leather goods. Commended for excellent make, handsome patterns, novelty, and cheapness.

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491. **L. Schutte, Vienna, Austria.**

ARTICLES OF TORTOISE-SHELL.

Report.—Articles of tortoise-shell, with boxes, medallions, sleeve buttons, etc. Commended for very good finish and first-rate material and style.

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492. **F. J. Berg, Göteberg, Sweden.**

HUMAN HAIR WORK IN WIGS.

Report.—Human hair work in wigs. Commended for splendid finish, fine material, and elegant workmanship.

493. **Alma Nilsson, Landskrona, Sweden.**

JEWELRY MADE FROM FISH SCALES.

Report.—Jewelry made from fish scales, of a splendid finish, fine workmanship, and good taste.

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494. **Ed. S. Mawson & Son, Philadelphia, Pa., U. S.**

SEAL SACKS, CAPS, GAUNTLETS, GLOVES, ETC.

Report.—Commended for good display, fitness, and elegance of pattern.

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495. **Durgee & Hallet, Rahway, N. J., U. S.**

RAW, PICKED, DRESSED, AND DOMESTIC DYED SEAL FURS.

Report.—Commended for general skill and utility.

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496. **W. H. & R. Burnett, Newark, N. J., U. S.**

FURS AND OPERA CLOAKS.

Report.—Commended for good patterns, rich variety, and good material.

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497. **F. Booss & Brother, New York, N. Y., U. S.**

FANCY FUR ROBES AND VELVET SACK.

Report.—A great and magnificent variety of fancy fur robes, made from white fox, black bear, natural beaver, plucked, and red fox; also a fine velvet sack lined with royal ermine and trimmed with chinchilla; Alaska seal sack, and Shetland seal sack, with sea-otter trimmings; hats, caps, gloves, and gauntlets, all fitted up in a very tasteful style, and well sewed. Commended for taste, good quality, and excellence in fitness.

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498. **Otto Kaehler, Philadelphia, Pa., U. S.**

STUFFED ANIMALS, AND RAW AND DRESSED SKINS.

Report.—A good set of stuffed animals, raw and dressed skins, and fur robes; also a new pattern of dusters made from tails, and a very nice pattern of muffs for ladies, with crossed compartments able to contain all the small objects necessary to a lady; elegant and serviceable.

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499. **Geo. C. Treadwell & Co., Albany, N. Y., U. S.**

SEALSKINS.

Report.—A very important variety of sealskins, showing the perfection attained in plucking and dyeing the raw seal furs, and makes a domestic industry of these heretofore imported furs. Commended for superior workmanship and quality.

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500. **J. A. Stambach & Co., Philadelphia, Pa., U. S.**

LADIES' FINE FURS.

Report.—A good display of Russian sable, silvered fox, cross fox, and sealskin. Commended for great variety, elegant style, and fine workmanship.

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501. **Reynolds & Völkel, Montreal, Canada.**

WOLF ROBES AND RUGS.

Report.—Very fair wolf robes and rugs, ladies' musk-rat pelerines, caps, muffs, gauntlets, Indian buckskin leggings and hunting overcoats, all in great and handsome variety. Commended for quality and fitness for use.

502. Hudson Bay Co., Montreal, Canada.

RAW FURS AND ESQUIMAUX SEALSKIN COAT.

Report.—A fine display of raw furs, white bear, brown and black bear, mink, lynx, white, gray, and blue wolf, beautiful red, silver, and cross fox, and other fine varieties of skins. There is to be mentioned also a very fair Esquimaux sealskin coat, and dressed reindeer skins. Commended for great variety and superior quality of furs.

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503. Thibault, Lanthier, & Co., Montreal, Canada.

FURS, ERMINE, AND MUFFS.

Report.—Two splendid cases of furs, ermine muffs, silk muffs with trimmings of ermine, Northshore otter coat for gentlemen, South Sea seal sacks, Northern Canada mink sacks, blue and silver raccoon, ladies' velvet bonnets, grebe and silver-pointed sea-otter muffs, silk opera cloak lined with royal ermine, and a beautiful variety of other skins. Commended for quality, taste, cheapness, and superior workmanship.

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504. C. Kaiser & Son, Halifax, Canada.

NATURAL RACCOON AND BLACK-BEAR ROBES.

Report.—Splendid natural raccoon and black-bear robes, red, blue, and cross fox skins, musk-rat and Canada mink muffs and boas, and sealskin sacks. Commended for good patterns and fine workmanship.

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505. Miss Kate Farrell, Toronto, Ontario, Canada.

CARRIAGE RUG OF WORSTED YARN.

Report.—Commended for skill and taste, both in color and design.

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506. Hector Evelyn Liardet, Wellington, New Zealand.

FEATHER FURS.

Report.—A variety of ladies' muffs, tippets, and cuffs, made from the skins of white, mottled, gray, and brown albatross, the white-back ganol, and the gray, green, and speckled cormorant. Commended for specialty, novelty, good work, durability, and cheapness.

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507. Commissioners for Victoria, Melbourne, Victoria, Australia.

FURS.

Report.—Plain rugs made from skins of native animals, viz., the bear or sloth, opossum, and cat; also fancy rugs of different kinds of skins, in tasteful designs, well made, and cheap.

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508. P. A. Jennings, Sydney, New South Wales, Australia.

FURS.

Report.—His exhibit consists of a muff, collarette, and pair of cuffs, very neatly made from the skins of the platypus; also two stuffed platypus skins, male and female. Commended for specialty, novelty, and good workmanship.

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509. Wedernikof & Mikhailof, St. Petersburg, Russia.

FUR AND TRIMMINGS MANUFACTURED INTO LADIES' CLOAKS.

Report.—A handsome display of fur and trimmings manufactured into ladies' cloaks; red and velvet costumes in Russian style, trimmed with sable; opera cloak of blue velvet, lined and trimmed with white Thibet kid fur, of a splendid effect. Commended for good material, tasteful patterns, and elegance in style.

510. Maurice Gruenwald, Riga, Russia.

FURS.

Report.—A very fine collection of silver and black fox raw skins; dressed furs of sable, ermine, sealskin, lynx, white, black, and gray Astrakan, Angora, Thibet, marten, brown and black bear; silver musk-lined furs, in red and blue fox, hare, and squirrel; seal hunting-jackets, muffs, caps, gloves; waistcoats of superior quality and at reasonable prices. Commended for the beautiful selection and superior workmanship.

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511. Odnoushefsky & Sons, St. Petersburg, Russia.

FURS.

Report.—A handsome exhibit of muffs, collars, and gorgettes, in sable, stone-marten, and musk-rat; fine robes in white Thibet skins of the most elegant effect; black sable skins; also a carpet composed of a great variety of furs. Commended for skill and quality.

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512. Revillon Brothers, Paris, France.

FURS MADE INTO CLOTHING.

Report.—An elegant and fine display of fur trimmings and of furs manufactured into clothing. There are some seal cloaks, trimmed with silvered beaver; opera cloaks lined with red fox belly and trimmed with beaver; velvet cloaks lined with silk and trimmed with chinchilla; jackets and paletots for ladies and gentlemen, trimmed with Russian sable, silver and fox, of the most magnificent style; also muffs and boas in chinchilla, ermine, grebe, mink, skunk, and wolverine. Commended for quality, style, and elegance in the patterns.

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513. A. S. Rustad, Drammen, Norway.

FURS.

Report.—His exhibit consists of carpets of white polar bear, black bear, and eider down, trimmed with eider heads; a lady's sack of white rabbit; a lady's cloth sack, with white kid lining and black Astrakan trimming; a man's wolf-skin coat; and a pair of North Sea sealskin boots, all of fair workmanship and moderate prices; also dressed red fox, lynx, badger, otter, and cat lynx, all of good quality.

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514. C. Brandt, Bergen, Norway.

FURS.

Report.—A large assortment of dressed furs, mostly native, consisting of carpets in polar bear, grizzly bear, black bear, lynx, gray wolf, red, cross, and white fox, and reindeer; a beautiful carpet of loon skins, and another of bird skins; also eider-down carpets, trimmed with eider-ducks' heads, a dressed loon skin, white bear skins, and ten otter skins, all of good workmanship and at fair prices, forming a good exhibit.

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515. P. N. Bergström, Stockholm, Sweden.

FURS.

Report.—A very large stock of dressed native furs; a good variety of men's coats, caps, boots, women's fur mantles, sacks, muffs, boas, and bonnets; all of good workmanship and design, at reasonable prices; forming together an excellent exhibit.

516. **D. Forsell & Co., Stockholm, Sweden.**

FURS.

Report.—An immense stock and great variety of dressed native furs of excellent quality; men's fur clothing, consisting of caps, coats, gloves, gauntlets, etc.; women's sacks, hoods, muffs, and boas, of varied material and good workmanship, at reasonable prices; also a parlor carpet, 14 × 11 feet, in many sorts of furs, of exquisite artistic design and good workmanship; forming in the whole a standard collection.

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517. **Crouch & Fitzgerald, New York, N. Y., U. S.**

TRUNKS.

Report.—Ladies' traveling trunk of excellent construction and design.

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518. **J. Lagowitz & Co., New York, N. Y., U. S.**

TRUNKS AND BAGS.

Report.—Commended for large assortment, good workmanship, and moderate cost.

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519. **J. C. Gillmore & Co., New York, N. Y., U. S.**

TRUNKS.

Report.—Commended for high degree of excellence in the general construction, and useful improvement in the rubber corner protectors.

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520. **J. C. Hacker, New York, N. Y., U. S.**

FANCY LEATHER WORK.

Report.—Commended for a high degree of excellence in general finish.

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521. **J. Fourestier Simpson, Philadelphia, Pa., U. S.**

PATENT TRUNK FASTENER AND LOCK COMBINED.

Report.—Commended for novelty, utility, and low cost.

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522. **Edward Simon & Brothers, Newark, N. J., U. S.**

TRUNKS AND BAGS.

Report.—Commended for good quality and workmanship, in view of price.

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523. **T. B. Peddie & Co., Newark, N. J., U. S.**

TRUNKS, VALISES, BAGS, AND STRAPS.

Report.—Commended for a large and varied exhibit, excellent style, and workmanship.

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524. **C. F. Rumpp, Philadelphia, Pa., U. S.**

FANCY LEATHER WORK.

Report.—A very nice and tasteful collection of home-made patterns in purses, wallets, cigar cases, pocket books, etc., at very reasonable prices. Commended for style of pattern and workmanship.

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525. **G. F. Kolb & Son, Philadelphia, Pa., U. S.**

CASES FOR JEWELRY AND SILVER WARE.

Report.—Commended for well-made and good patterns, double hinge as a useful improvement, workmanship, utility, and novelty.

526. **H. H. Peacock, Philadelphia, Pa., U. S.**

FANCY CASES OF MOROCCO, VELVET, AND WOOD MARQUETRY.

Report.—Commended for workmanship, quality, and fitness.

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527. **Richard Hoe & Sons, London, England.**

PORTMANTEAUS, HAT-CASES, AND BAGS.

Report.—The portmanteaus, hat-cases, and bags are very well made, in a very practical form, and good finish. Commended for substantial material and workmanship.

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528. **Mrs. Constant, Halifax, Nova Scotia.**

LEATHER WORK FOR MIRROR-FRAME.

Report.—Commended for excellence in tasteful design and great skill in execution.

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529. **Mrs. Neville, Ottawa, Canada.**

LEATHER WORK.

Report.—Commended for artistic skill and taste in design and execution.

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530. **W. E. Clarke, Toronto, Ontario, Canada.**

TRUNKS, VALISES, BAGS OF CALF LEATHER AND WOOD, WITH NICKELED IRON BUCKLES.

Report.—Commended for fitness and quality as well as cheapness; also for fine workmanship and good appearance.

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531. **R. Zimmermann, Moscow, Russia.**

TRUNKS AND VALISES.

Report.—Commended for practicability in design and excellence in finish.

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532. **William Nissen, St. Petersburg, Russia.**

TRUNKS AND VALISES.

Report.—Commended for large and varied assortment of substantial make and excellence of design.

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533. **William Nissen, St. Petersburg, Russia.**

LEATHER OVERCOAT.

Report.—Leather overcoat of fine texture, softness, hair-side out, glossy and black, sleeves and pockets lined with Italian cloth, body and skirts of fine heavy flannel. The whole is finely made, of most thorough sewing, in superior style as a water-proof garment. Commended for strength, durability, flexibility, and water-proof quality.

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534. **Lamarre, Paris, France.**

FANCY GOODS IN LEATHER AND TORTOISE-SHELL; ALBUMS, ETC.

Report.—Commended for good variety of patterns, fine finish, and elegant taste.

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535. **W. Walcker, Paris, France.**

TRUNKS, VALISES, TOILET BOXES, AND TRAVELING ARTICLES.

Report.—Commended for great variety, good adaptation, and novelty.

536. **José d'Azevedo David, Oporto, Portugal.**

LEATHER-COVERED WOODEN TRUNKS.

Report.—Commended for very strong make and cheapness.

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537. **François Vité, Berlin, Germany.**

FANCY LEATHER GOODS.

Report.—Commended as well finished and at very low prices.

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538. **Michael Seewald, Vienna, Austria.**

LEATHER INKSTAND AND CANDLESTICKS.

Report.—Leather inkstand and candlesticks; manufactured on a large scale. Commended for cheapness, novelty, and good finish.

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539. **Rodeck Brothers, Vienna, Austria.**

FANCY LEATHER GOODS.

Report.—A large variety of patterns, every piece nicely finished. Commended for great novelty in design and fine workmanship.

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540. **Eugenio Mattaldi, Buenos Ayres, Argentine Republic.**

A TRUNK REPRESENTING A COUCH, A DINING-TABLE, A WRITING-DESK, AND A TOILET-TABLE.

Report.—A trunk representing a couch, a dining-table, a writing-desk, and a toilet-table; very ingenious and useful. Commended for originality.

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541. **Güntsche & Schroeder, Buenos Ayres, Argentine Republic.**

TRUNKS AND VALISES OF LEATHER.

Report.—Trunks and valises of leather. Commended for good and strong make, durable and fine workmanship, and cheapness.

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542. **Isaac Bedichimer, Philadelphia, Pa., U. S.**

GOLD AND SILVER EMBLEMS.

Report.—Commended for the beauty of design, the carefulness in finish, and adaptation to the purposes required.

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543. **W. H. Horstmann & Sons, Philadelphia, Pa., U. S.**

FLAGS, INSIGNIA, AND EMBLEMS.

Report.—Commended for the excellence of workmanship, variety of exhibit, and correctness in design.

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544. **Schuyler, Hartley, & Graham, New York, N. Y., U. S.**

SOCIETY GOODS.

Report.—Commended for superior workmanship, and adaptation for special occasions and presentations.

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545. **James A. Haas & Co., Philadelphia, Pa., U. S.**

METALLIC EMBLEMS.

Report.—Commended for character of finish and appropriate designs.

546. **J. H. Wilson, Philadelphia, Pa., U. S.**

SOCIETY SWORDS, CAPS, AND REGALIA.

Report.—Commended for workmanship and variety.

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547. **Clarence A. Hart, Philadelphia, Pa., U. S.**

PAINTED SILK BANNERS AND PAPER FRINGE.

Report.—Commended for the adaptation to the purposes designed, and the economy in their production.

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548. **J. P. Reynolds & Co., New York, N. Y., U. S.**

ESCUTCHEONS FOR MILITARY AND NAVAL SERVICE.

Report.—This exhibit consists of highly ornate decorated designs of shields, on which, by a most ingenious device, any soldier may have recorded, for permanent preservation, his whole military record in very small space.

Commended for originality, ingenuity, and admirable adaptation to the purpose for which it is designed.

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549. **John C. Meyer, New Orleans, La., U. S.**

BADGES AND INSIGNIA FOR SOCIETIES.

Report.—Commended for taste in design and excellence in workmanship.

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550. **George P. Pilling, Philadelphia, Pa., U. S.**

SOCIETY JEWELS.

Report.—Commended for good workmanship, variety, and finish.

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551. **M. C. Lilly & Co., Columbus, Ohio, U. S.**

MASONIC GOODS AND SOCIETY SUPPLIES.

Report.—Commended for the beauty of design in the embroidery, and skill in workmanship.

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552. **Camille Piton, Philadelphia, Pa., U. S.**

TROPHIES REPRESENTING AMERICA, EUROPE, ASIA, AND AFRICA.

Report.—Commended for artistic talent displayed in the arrangement of colors, and harmony in variety, beauty in design, and skill in execution.

---

553. **Mayaud Brothers, Paris, France.**

MEDALS AND ORNAMENT.

Report.—A great variety of religious articles, rosaries, and crucifixes; four thousand different patterns, ranging from the commonest to the finest styles. Commended for fitness, cheapness, and workmanship.

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554. **National Museum of Egypt, Cairo, Egypt.**

NATIONAL COSTUMES.

Report.—A collective exhibit of various articles worn in Egypt, consisting of a crown of braided gold, jackets, vest, caps, shawls, and dress scarfs in silk richly embroidered; Arab dress in brown wove silk embroidery; the dress worn by the Archbishop of Abyssinia, a very curious, costly, and rare garment, seldom to be obtained, and held in great esteem as a national vestment; a cap made by King Meteza of Ouganda with his own hands, and presented by him to the Egyptian Government.

555. **His Highness Sidi Mohammed Essadole (Bey of Tunis).**

NATIONAL COSTUMES.

Report.—A very large and rare collection of costly costumes of the country, presenting the most elaborate workmanship and finish; bridal and female costumes; tribal coats; boys' suits of velvet and gold; men's costumes, elaborately finished with silver braid; the common people's capote and burnouse; also the burnouse and hood worn by the wealthy classes. Commended for the variety of the exhibit and elaborate workmanship displayed.

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556. **Haim Vidal & Co., Constantinople, Turkey.**

NATIONAL TURKISH COSTUMES.

Report.—An exhibit of rare and costly Turkish costumes, consisting of richly embroidered sacks, coats, and vests; the holiday costumes of the Sultan's guards, richly embroidered with gold on crimson velvet; ladies' dresses of silk, elaborately embroidered alike on both sides with gold embroidery; the native burnouse, also richly embroidered with gold on silk ground; silk velvet and cashmere scarfs of silk and gold capuchin for the neck; and opera head covers of fine cashmere. Commended for the large and elaborate display and fine finish of the goods.

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557. **Royal Swedish Commission, Stockholm, Sweden.**

PEASANTS' COSTUMES.

Report.—A collective exhibit of eight groups of peasants in their national costumes, presenting the different phases of society in their native apparel. The execution of these demands a special note, being very life-like, instructive, and attractive. Commended for the execution, variety, and design.

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558. **William Gram, Christiania, Norway.**

NATIONAL COSTUMES AND FIGURES.

Report.—These groups are well executed, and present the peculiar habits, manners, and dress of the Laplander in the most perfect manner, and are instructive, historical, and useful for educational purposes. Commended for execution and design.

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559. **H. C. Jones & Co., Philadelphia, Pa., U. S.**

BRUSH BLOCKS.

Report.—Commended for an improved method in boring, resulting in a reduction of cost.

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560. **Charles P. Sellers, Philadelphia, Pa., U. S.**

CORN BROOMS AND WHISKS.

Report.—Commended for good substantial form, excellence of material, and workmanship.

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561. **C. T. Raynolds & Co., New York, N. Y., U. S.**

ARTISTS' PENCILS AND BRUSHES.

Report.—Commended for quality, fitness, and workmanship.

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562. **Miles Brothers & Co., New York, N. Y., U. S.**

VARIETY OF BRUSHES AND PENCILS.

Report.—Commended as well made and of good appearance; shaving brushes especially for quality, and full adaptation for the purposes intended.

563. **E. Clinton & Co., Philadelphia, Pa., U. S.**

BRUSHES AND PENCILS.

Report.—Commended for superior quality, skill, and fitness. He excels in every line of brushes and pencils, and seems to be able to compete with any other country.

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564. **George Barton, Kent, & Co., London, England.**

BRUSHES AND IVORY WORK.

Report.—Brushes and ivory work of very fine finish, especially the hair brushes. Commended for fine workmanship and good taste.

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565. **G. R. Grind, London, Ontario, Canada.**

CORN BROOMS AND WHISKS.

Report.—Commended for excellent quality, great variety, very low prices, fitness, and workmanship.

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566. **C. Boeck, Toronto, Ontario, Canada.**

BRUSHES.

Report.—A very good set of hair and painting brushes, horse brushes, well made and durable; also an improvement in hair brushes, for regulating the softness and stiffness of the brush. Commended for general quality and novelty.

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567. **Whitehead & Turner, Quebec, Canada.**

BRUSHES OF ALL KINDS.

Report.—Commended for excellent quality and moderate prices.

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568. **Deschamps, Maurey, & Co., Paris, France.**

BRUSHES OF ALL KINDS.

Report.—Commended as well made, of good material, and superior fitness.

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569. **Pitet, Sr. & Jr., Paris, France.**

PENCILS AND PAINTING BRUSHES.

Report.—A great variety, ranging from the most popular styles to the most artistic ones. Commended for fine finish.

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570. **A. Dupont, Beauvais, France.**

TOOTH BRUSHES.

Report.—Commended for superior fitness, durability, and cheapness.

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571. **F. Loonen, Paris, France.**

BRUSHES.

Report.—A splendid display, mounted in ivory and carved very tastefully; a mirror of very elegant style. Commended for good material, superior taste, and elegance in workmanship.

572. **Antonio Raymundo de Carvalho, Lisbon, Portugal.**

BRUSHES.

Report.—Commended for great variety, very tasteful and nice patterns, durability, fine workmanship, and low prices.

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573. **Luigi Giacomini & Co., Treviso, Italy.**

CLOTH BRUSHES.

Report.—Cloth brushes of good workmanship, finish, and extraordinary cheapness.

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574. **Dionys Pruckner, Munich, Germany.**

TOILET, CLOTH, AND HAT BRUSHES.

Report.—Commended for good workmanship and low prices.

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575. **Glendale Elastic Fabric Co., East Hampton, Mass., U. S.**

WOVEN AND BRAIDED ELASTIC RUBBER FABRICS.

Report.—A large variety of goods of fine quality, style, and workmanship, with special mention of corded edge fabrics.

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576. **East Hampton Rubber Thread Co., East Hampton, Mass., U. S.**

INDIA RUBBER THREAD.

Report.—Commended for quality, skill, workmanship, and fitness for purpose intended.

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577. **New York Belting & Packing Co., New York, N. Y., U. S.**

EMERY VULCANITE.

Report.—Commended for originality, durability, evenness of grit and texture, and the facility with which the form of the grinding surface may be renewed or modified.

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578. **New York Belting & Packing Co., New York, N. Y., U. S.**

INDIA RUBBER GOODS.

Report.—The exhibit includes valve gum, packing, fibrous, and sheet used for pistons; a great variety of hose, car springs, and carriage springs, of great homogeneity of composition and perfection of curing. Commended for finish and high grade of merchantable excellence.

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579. **New York Belting & Packing Co., New York, N. Y., U. S.**

TEST HOSE—VULCANIZED RUBBER.

Report.—Vulcanized hose for fire-engines. The duck, which is of excellent fabric, is saturated with carbolic acid, coated with rubber, and fashioned into tubing so as to disperse the warp and filling obliquely to the axis of the hose, and to give the highest degree of flexibility and elasticity consistent with strength. The hose is lined and coated with rubber, smooth and of excellent composition, the whole fashioned and cured with care. It burst under direct pressure in two experiments at four hundred and twenty-five pounds and four hundred and fifty pounds. Commended for durability, flexibility, and strength.

580. New York Belting & Packing Co., New York, N. Y., U. S.

RUBBER BELTING.

Report.—The belting is of various widths to forty-eight inches, of thickness from three to five ply, of length to three hundred and twenty feet. In strength, as determined by experiment under direction of Captain Albert, a three-ply three-inch belt gave way at three thousand pounds. In adhesion, a six-inch belt with a weight of fifty pounds at either end over a fifteen and three-quarter inch exterior diameter, smooth cast-iron fixed pulley, slipped at seventy pounds. The thickness of the belt was three-ply, seven thirty-seconds of an inch. Commended for adhesion, strength, smooth finish, and care in workmanship and curing.

---

581. National Rubber Co., Providence, R. I., U. S.

INDIA RUBBER GOODS AND MANUFACTURES.

Report.—A large variety of well-made rubber goods, especially rubber shoes. Commended as well made, good style, and, with regard to "Snow Excluder," for originality and fitness for purpose intended; rubber clothing, reversible coats, commended as of good workmanship; "flocked clothing," commended as of fine finish and original design; "flocked piano covers," commended for originality, utility, and workmanship; Chaffee's perforated cellular door mats and curry combs, commended for utility and fitness for purpose intended; flexible backgammon boards, inlaid with flannel, commended for originality; nursery sheeting, commended for utility and fitness for purpose intended.

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582. National Rubber Co., Providence, R. I., U. S.

BELTING.

Report.—The belting is made of fine quality of duck and composition carefully prepared and cured. A three-inch three-ply belt, five thirty-seconds of an inch in thickness, gave way under a strain of thirty-five hundred pounds. In adhesion, as shown by experiments under direction of Captain Albert, a six-inch four-ply belt, seven thirty-seconds of an inch in thickness, over a smooth cast-iron pulley of extreme diameter of fifteen and three-quarter inches, with a weight of fifty pounds at either end, slipped with additional weight of sixty and three-quarter pounds (the pulley being rigid) added to one side. Commended for its strength, adhesion, finish, and care in workmanship and curing.

---

583. National Rubber Co., Providence, R. I., U. S.

FIRE HOSE.

Report.—Two and a half inches calibre, four-ply, cloth wound round the mandril, with warp parallel to the axis of the hose, of smooth interior, thorough workmanship, and careful curing. A section of fifty feet in length and weighing fifty-nine pounds sustained, without bursting, a pressure of five hundred pounds. Commended for quality in composition, care in making up, and for strength.

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584. National Rubber Co., Providence, R. I., U. S.

RUBBER SHOE MANUFACTURE.

Report.—The exhibit consists of a complete set of material and machinery manufactured by William E. Kelly, of New Brunswick, New Jersey, and complement of operatives for producing vulcanized rubber shoes, including the breaking down, cleaning, and air-curing of Para rubber, grinding in of composition, stamping, embossing, spreading on cloths, cutting into patterns, making the shoes in green condition, and curing by heat. Commended

for taste and skill as an industrial display of the most approved apparatus for exhibiting in detail all the steps of the processes by which vulcanized rubber shoes are made, from the crude rubber and cloth to the final curing.

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585. Gutta Percha & Rubber Manufacturing Co., New York, N. Y., U. S.

FIRE HOSE.

Report.—This hose is wound with duck coated with carbolized rubber composition, with warp of the duck parallel to the axis of the hose. A section fifty feet in length, of two and one-half inch calibre, four-ply hose, and weighing sixty-seven and one-half pounds, burst at a pressure of four hundred and thirty-five pounds. Commended as well made, carefully cured, and adapted to the purpose intended.

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586. India Rubber Comb Co., New York, N. Y., U. S.

HARD RUBBER GOODS.

Report.—A large exhibit of manufactures of fine quality, design, and workmanship, especially ten-pin balls. Commended for originality, skill, and fitness for purpose intended.

Rubber-coated calender rolls. Commended for originality, skill, and fitness for purpose intended.

Tubes of large calibre. Commended for originality, skill, and finish.

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587. Clark S. Merriman, New York, N. Y., U. S.

WATER-PROOF LIFE-SAVING DRESS.

Report.—Commended for invention, fitness for purpose intended, and utility.

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588. Crane & Co., Newark, N. J., U. S.

FLEXIBLE RUBBER BITS.

Report.—Commended for utility, and fitness for purpose intended.

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589. Nashawannuck Manufacturing Co., East Hampton, Mass., U. S.

ELASTIC RUBBER SUSPENDERS AND WEBS.

Report.—Commended for fine workmanship and neatness of patterns of suspenders and webs.

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590. Vulcanite Jewelry Co., New York, N. Y., U. S.

VULCANITE JEWELRY.

Report.—Commended for good quality and workmanship.

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591. Goodyear Rubber Co., New York, N. Y., U. S.

RUBBER GOODS.

Report.—Commended for quality and workmanship.

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592. W. B. S. Taylor, New York, N. Y., U. S.

FLEXIBLE TUBING.

Report.—Commended for invention, utility, and fitness for purpose intended.

593. **Austin G. Day, Seymour, Conn., U. S.**

KERITE.

Report.—Commended for originality, economy, and cost. This exhibitor also shows a large number of rubber-producing plants, including twenty different varieties.

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594. **Gossamer Rubber Clothing Co., Boston, Mass., U. S.**

GOSSAMER WATER-PROOF CLOTHING.

Report.—Commended for adaptation to public wants, and low cost.

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595. **Gutta Percha & Rubber Manufacturing Co., New York, N. Y., U. S.**

VULCANIZED RUBBER GOODS.

Report.—The exhibit includes fibrous and sheet packing, piston packing, valve gum, billiard cushions, four-ply belting, seven thirty-seconds of an inch thick, six inches wide, which slipped on a closed pulley fifteen and three-quarter inches exterior diameter, under a strain of fifty pounds at either end, upon the addition to one end of forty-eight and three-quarter pounds; garden and mining hose, carbolized in the composition. Commended for quality, extent of variety, and adaptation to purpose intended.

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596. **Davidson Rubber Co., Boston, Mass., U. S.**

RUBBER GOODS AND MANUFACTURES.

Report.—A fine exhibit of soft rubber goods, including druggists', surgical, medical, stationery, and light goods of very superior quality, design, and finish, with special mention of pure rubber mattresses of excellent design and workmanship, gloves of good style and finish, water and sponge bags, dress shields, well fitted for purpose intended, seamless tubes, of good quality and workmanship and not liable to split.

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597. **J. Dickson & Co., Philadelphia, Pa., U. S.**

ENGRAVING ON VULCANIZED RUBBER.

Report.—Commended for invention, utility, economy, and cost.

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598. **G. M. Mowbray, North Adams, Mass., U. S.**

PURE GUTTA PERCHA FOR TRUSSES AND INSULATORS.

Report.—Well-purified gutta percha, adapted to purpose intended.

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599. **New Brunswick Rubber Co., New Brunswick, N. J., U. S.**

RUBBER BOOTS AND SHOES.

Report.—Commended for excellence in form and finish, good quality, and workmanship.

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600. **Andrew Albright, Newark, N. J., U. S.**

HARD RUBBER COATED HARNESS AND CARRIAGE TRIMMINGS.

Report.—Commended for originality and fitness for the purpose intended, fine workmanship, and finish.

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601. **J. C. Hempel, Baltimore, Md., U. S.**

RUBBER DIAPER.

Report.—Commended for quality and fitness for the purpose intended.

602. **Moulded Heel Stiffening Co., Lynn, Mass., U. S.**

MOULDED RUBBER COUNTERS FOR SHOES.

Report.—Commended for utility, fitness for purpose intended, and economy.

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603. **Simon, May, & Co., Nottingham, England.**

GORINGS, GUSSETING, AND BOOT WEBS.

Report.—Commended for a great variety of goods, of fine quality and workmanship.

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604. **H. Schrader, St. Petersburg, Russia.**

VULCANIZED RUBBER PRODUCTS.

Report.—The exhibit includes belting, smooth, and of fine finish, garden hose, hemp hose lined with rubber, and rubber speaking tubes, billiard cushions, pulleys, packing, gaskets, and valve gum, in various forms. Commended for beautiful finish, homogeneity in composition, and for splendid curing.

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605. **Russian American India Rubber Co., St. Petersburg, Russia.**

RUBBER GOODS AND MANUFACTURES.

Report.—A fine exhibit of a large variety of rubber goods, including clothing, shoes, druggists', medical, and surgical goods of soft rubber. Commended for good workmanship, quality, and design, and finish, especially for a coachman's coat of checked cotton covered with rubber of very fine surface and perfectly white; also cylinder cover of soft rubber with hard rubber surface.

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606. **G. Magnus & Co., Berlin, Germany.**

HARD RUBBER BILLIARD BALLS.

Report.—Commended as of excellent quality, and well fitted for purpose intended.

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607. **Bally & Schmitter, Aarau, Switzerland.**

ELASTIC GORING.

Report.—A large assortment of silk, cotton, and linen elastic goring, of fair quality and low prices.

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608. **United States Navy Department, Washington, D. C., U. S.**

UNITED STATES FLAGS AND NAVAL COSTUMES.

Report.—Commended for the elaborate display and historical value of the national flags and pennants and naval costumes.

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609. **United States War Department, Washington, D. C., U. S.**

FLAGS AND MILITARY COSTUMES.

Report.—Commended for the character of the workmanship, and historical value and liberality of numerical exhibits.

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610. **Smithsonian Institution, National Museum, Washington, D. C., U. S.**

SKINS AND FURS.

Report.—This institution, which, in a collective exhibit, shows the most complete and systematic display of the various series and grades of excellence in crude dressed with long hairs, plucked and dyed fur seals of Alaska and South Pacific, as well as other furs.

We consider also as a duty to mention the names of the gentlemen who selected their finest specimens and placed them at the service of the institution.

Among them we mention Mr. Chas. Herpich, of New York, Messrs. Treadwell & Co., of Albany, Mr. Bowsky, of New York, and Messrs. Renfrew & Co., of Canada.

It is very interesting to see how far this industry was brought in the United States, and, as a show for public instruction, the Smithsonian exhibit is a true success.

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611. The Royal School of Art Needle Work, South Kensington, London, England.

EMBROIDERY AND NEEDLE-WORK.

Report.—Commended for design and beautiful shade of colors, and for its eminent success in showing the capabilities of needle-work as a decorative art. The embroideries from classical and floral designs are admirably executed, and beautiful in effect. The whole exhibit is recognized as artistic in design and faithful in execution, noble in its object, and practical in its uses.

SIGNING JUDGES OF GROUP X.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

WM. O. LINTHICUM, 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 44, 45, 56, 64, 67, 71, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 107, 108, 118, 154, 155, 161, 318, 432, 438.

E. N. HORSFORD, 7, 8, 14, 27, 320, 345, 377, 404, 423, 437, 533, 548, 577, 578, 579, 580, 582, 583, 584, 585, 595, 604.

M. P. EMPEY, 13, 506, 507, 508, 513, 514, 515, 516.

B. F. BRITTON, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 57, 59, 60, 61, 62, 63, 65, 66, 68, 69, 70, 72, 73, 74, 90, 103, 119, 138, 141, 186, 196, 220, 221, 222, 223, 242, 243, 244, 248, 251, 252, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 268, 269, 270, 272, 273, 274, 287, 288, 289, 290, 291, 292, 293, 296, 297, 298, 299, 308, 310, 312, 314, 315, 316, 317, 321, 324, 326, 331, 337, 338, 344, 353, 367, 371, 372, 373, 378, 385, 389, 393, 394, 395, 409, 419, 426, 427, 436, 439, 441, 443, 445, 461, 462, 463, 464, 505, 517, 518, 519, 520, 521, 522, 523, 527, 528, 529, 531, 532, 559, 564, 572.

DIETZ-MONNIN, 58, 120, 121, 144, 149, 150, 170, 171, 173, 174, 175, 179, 180, 181, 182, 183, 184, 185, 187, 188, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 219, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 245, 246, 247, 249, 250, 253, 267, 271, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 294, 295, 300, 301, 302, 303, 304, 305, 306, 307, 313, 319, 322, 327, 328, 329, 332, 333, 341, 342, 343, 346, 347, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 368, 369, 370, 381, 384, 396, 397, 398, 399, 412, 413, 414, 415, 422, 425, 428, 434, 451, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 509, 510, 511, 512, 530, 537, 538, 539, 560, 561, 562, 563, 570, 574, 610, 611.

MODESTE KITTARY, 101, 102, 104, 105, 106, 109, 110, 111, 112, 113, 114, 115, 116, 117, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 139, 140, 142, 143, 145, 146, 147, 148, 151, 152, 153, 156, 157, 158, 159, 160, 162, 163, 164, 165, 166, 167, 168, 169, 172, 176, 177, 178, 323, 325.

EDWARD KANITZ, 189, 190, 191, 192, 193, 194, 195, 197, 198, 199, 200, 201, 216, 217, 218, 285, 286, 311, 330, 334, 335, 336, 339, 340, 354, 355, 356, 374, 375, 376, 379, 380, 382, 383, 386, 387, 388, 390, 391, 392, 400, 401, 402, 403, 405, 406, 407, 408, 410, 411, 416, 417, 418, 420, 421, 424, 429, 430, 431, 440, 442, 444, 446, 447, 448, 449, 450, 452, 453, 454, 455, 456, 457, 458, 459, 460, 465, 466, 467, 468, 492, 493, 524, 525, 526, 534, 535, 536, 540, 541, 553, 565, 566, 567, 568, 569, 571, 573.

W. H. CHANDLER, 309, 348, 349, 350, 351, 352, 435, 575, 576, 581, 586, 587, 588, 589, 590, 591, 592, 593, 594, 596, 597, 598, 599, 600, 601, 602, 603, 605, 606, 607.

GEORGE HEWSTON, 433, 542, 543, 544, 545, 546, 547, 549, 550, 551, 552, 554, 555, 556, 557, 558, 608, 609.

SUPPLEMENT TO GROUP X.

REPORTS

OF

JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.
COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

1. **Lewis Fishblatt, Philadelphia, Pa., U. S.**

FUR ROBE.

Report.—Commended for a robe, of various colors and excellent workmanship, representing the arms of the United States.

2. **Wheeler & Wilson Manufacturing Co., Bridgeport, Conn., U. S.**

SEWING MACHINE NEEDLE WORK.

Report.—Commended for a superb display of needle work executed upon the Wheeler & Wilson sewing machine, exquisite in design and finish, from the lightest gauze to the heaviest leather.

3. **James Fallows & Co., Philadelphia, Pa., U. S.**

PAPER AND TIN TOYS.

Report.—Commended for economy in cost, adaptation to purpose intended, and durability.

4. **F. Sachse & Son, Philadelphia, Pa., U. S.**

DRESS SHIRTS.

Report.—Commended for excellence in cut and style, and meritorious in workmanship.

5. **Olivia P. Flynt, Boston, Mass., U. S.**

IMPROVEMENT IN KNIT UNDERWEAR FOR WOMEN AND CHILDREN.

Report.—An important and unique improvement, well adapted to the purpose intended.

6. **Coon & Van Volkenburgh, Philadelphia, Pa., U. S.**

LINEN COLLARS AND CUFFS.

Report.—Commended for excellence in style, and meritorious in construction and workmanship.

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7. **Littleton Saranac Buck Glove Co., Littleton, N. H., U. S.**

BUCK GLOVES.

Report.—Commended for originality in preparation of the skins, good workmanship, and fitness for purpose intended.

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8. **Mrs. J. S. Bloodgood, New York, N. Y., U. S.**

AFGHANS AND CARRIAGE ROBES.

Report.—Commended for tasteful design and skillful workmanship.

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9. **Louis Jeannisson & Son, Johnstown, N. Y., U. S.**

GLOVES.

Report.—Commended for excellence in material, shape, and workmanship.

---

10. **Adolf Bowsky, New York, N. Y., U. S.**

DRESSED FURS.

Report.—Commended for general excellence of preparation of skins of animals for furriers' use.

---

11. **Mrs. Jacquemin, St. Louis, Mo., U. S.**

ARTIFICIAL FLOWERS.

Report.—A good exhibit. Representations skillfully constructed and truthful to nature.

---

12. **M. Louise Glover, Augusta, Me., U. S.**

WORSTED WORK, COMPRISING BASKET OF FRUIT, SOFA PILLOW, AND ANTEMACASSAR.

Report.—Commended for originality in design and high order of workmanship.

---

13. **A. Bedford, Boston, Mass., U. S.**

BEDFORD'S EUREKA AIR-PISTOL.

Report.—Commended for simplicity in construction, accuracy, safety, and fitness for purpose intended.

---

14. **Maize & Schwartz, Philadelphia, Pa., U. S.**

MILITARY CLOTHING.

Report.—Commended for good workmanship, fitness for purpose intended, together with economy in cost.

---

15. **Wm. Wilkens & Co., Baltimore, Md., U. S.**

CURLED HAIR AND BRISTLES.

Report.—Commended for a creditable exhibit of American bristles displaying great care and skill in preparing for use. Curled hair, black and bleached, well prepared, and fitness for purpose intended.

16. **Samuel C. Jackson, New York, N. Y., U. S.**

JEWELRY CASES.

Report.—Commended for excellent designs and superior workmanship.

---

17. **Mrs. L. Noot, Philadelphia, Pa., U. S.**

LADIES' AND CHILDREN'S DRESSES AND CAPS.

Report.—Commended for exquisite taste in design and style, together with high grade of workmanship.

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18. **Charles Rumpp, Philadelphia, Pa., U. S.**

FANCY LEATHER GOODS.

Report.—Commended for excellent material used, combined with good workmanship.

---

19. **Charles Dubois, Portland, Oregon, U. S.**

FURS.

Report.—Commended for a good exhibit in Alaska sable and mink, and Shetland seal, displaying creditable workmanship.

---

20. **Joseph W. Barrett, Philadelphia, Pa., U. S.**

EMBROIDERY AND BRAIDING.

Report.—Commended as original and tasteful in designs and excellent in workmanship.

---

21. **Mrs. Thomas Weaver, Philadelphia, Pa., U. S.**

PYRAMID OF ARTIFICIAL FLOWERS.

Report.—Commended for a superb exhibit, tastefully arranged, displaying skill and ingenuity in construction.

---

22. **Miss Harriet Randolph Parkhill, Jacksonville, Fla., U. S.**

ARTIFICIAL FLOWERS MADE OF FISH SCALES.

Report.—Commended for a superb exhibit, consisting of brooch, ear-drops, bouquet de corsage, and cross; displaying ingenuity, skill, and artistic taste.

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23. **Carl Stehr, New York, N. Y., U. S.**

MEERSCHAUM AND AMBER PIPES.

Report.—Commended for excellent quality, tasteful designs, and skill in workmanship.

---

24. **Mrs. Elizabeth G. Harley, Haddonfield, N. J., U. S.**

COMPLETE DARNER.

Report.—Commended for utility and convenience.

---

25. **Hirsh & Brother, Philadelphia, Pa., U. S.**

PARASOLS AND UMBRELLAS.

Report.—Commended for superb ornamentation and excellent workmanship.

26. **C. E. Matthias, Philadelphia, Pa., U. S.**

UMBRELLAS.

Report.—Commended for a display of well-made gingham and alpaca umbrellas.

---

27. **Mrs. C. Wimpfheimer, Philadelphia, Pa., U. S.**

HAIR RIBBON.

Report.—A close resemblance to human hair. Commended for fitness for purpose intended.

---

28. **Turner, Andrews, & Co., Philadelphia, Pa., U. S.**

POCKET BOOKS, AND FANCY LEATHER GOODS.

Report.—An excellent display of wallets and fancy leather goods of good style and workmanship.

---

29. **Foy & Harmon, New Haven, Conn., U. S.**

COMBINED CORSET AND SKIRT SUPPORTER.

Report.—Commended for great excellence in material, workmanship, and form, originality in construction, imparting greater ease and comfort to the wearer.

---

30. **M. Sand, New York, N. Y., U. S.**

ARTIFICIAL FLOWERS.

Report.—A fine exhibit, showing good taste and skillful work.

---

31. **American Mechanical Toy Co., New York, N. Y., U. S.**

MECHANICAL TOYS.

Report.—A good exhibit of dancing and revolving figures of pleasing and entertaining designs.

---

32. **P. W. Lambert & Co., New York, N. Y., U. S.**

WALLETS, POCKET BOOKS, AND LADIES' BELTS.

Report.—A good exhibit, displaying good taste and workmanship.

---

33. **Mrs. K. Schmitt, Philadelphia, Pa., U. S.**

HAIR JEWELRY.

Report.—A superb exhibit of hair work, displaying unusual skill in execution, together with tasteful designs.

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34. **Antonio Castell de Pons, Barcelona, Spain.**

TAPESTRY.

Report.—Commended for a rich collection of hand-made tapestry, carpets, portières, rugs, etc., of Moorish patterns, excellent in quality of material and workmanship.

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35. **Lamary, Paris, France.**

SILK WATCH GUARDS AND RIBBONS.

Report.—Commended for good style and quality, together with economy in cost.

36. **I. Bidencope, Hobart Town, Tasmania.**

HATS AND CAPS OF SILK AND FELT, WITH MATERIAL FOR MANUFACTURE.

Report.—Felt hats of good quality and finish.

---

37. **Dolores Fernandez de Silo, Madrid, Spain.**

EMBROIDERY AND LACE.

Report.—Commended for exquisite workmanship.

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38. **Theodora de Ibarzabal, Guipuzcoa, San Sebastian, Spain.**

DAMASCENE WORKS.

Report.—Rich inlaid work of gold and silver in iron. Commended for good design and workmanship.

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39. **Miss Margarita Matute, Guadalajara, Mexico.**

EMBROIDERY.

Report.—Commended for a portrait executed with fine silk upon a handkerchief, displaying skill and perfection in needle work.

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40. **School of Art, Mayor de la Seda, Barcelona, Spain.**

PORTRAIT OF KING ALFONSO, WOVEN IN SILK.

Report.—Commended for skillful work and truthful representation.

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41. **José Pi y Solanas, Barcelona, Spain.**

BLOND LACES.

Report.—Commended for a very fine display of blond laces, mantillas, veils, basques, etc. Beautiful in design and workmanship.

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42. **D. Strauss & Co., St. Gallen, Switzerland.**

EMBROIDERED CURTAINS.

Report.—A good exhibit, tasteful in design.

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43. **Miss Josefina Mata y Campo, City of Mexico, Mexico.**

NEEDLE WORK.

Report.—Commended as tasteful in design and skillful in execution.

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44. **Debban Brulard, Damascus, Turkey.**

SILK GOODS.

Report.—Silk goods,—scarfs, and robes woven with ornamental figures in gold and silver thread. Silk goods of "Damascus stuff." Commended for richness in design and good quality of workmanship.

---

45. **Jacob Isler & Co., Wohlen, Switzerland.**

BRAIDS FOR LADIES' HATS MADE FROM STRAW AND HAIR.

Report.—Commended for excellence in quality and style.

46. Mechanical Embroidery Establishment, near Winterthur, Zurich, Switzerland.

EMBROIDERY FOR UPHOLSTERY AND LADIES' GARMENTS.

Report.—Commended for excellence in design, economy in cost, and fitness for purpose intended.

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47. Ulrich & A. Tobler, Rheineck and Thal, Switzerland.

EMBROIDERY.

Report.—Commended for good taste in design and excellent workmanship.

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48. C. G. Elrick, Aberdeen, Scotland.

HORN COMBS.

Report.—Commended for excellence in designs, workmanship, and general finish.

---

49. Geo. John Smith, Upper Norwood, Surrey, England.

IRISH LACES—POINT AND LIMERICK.

Report.—Commended for tasteful designs and excellent execution.

---

50. R. Sutter-Dörig, Appenzell, Switzerland.

EMBROIDERED HANDKERCHIEFS.

Report.—Commended for exquisite taste in design and skill in execution.

---

51. Hamlet Nicholson, Rochdale, England.

PATENT COMPOUND CRICKET BALLS.

Report.—Commended for fidelity in spherical shape, and for smooth and even surface.

---

52. S. Shi-i-no Shobeye, Yokohama, Japan.

EMBROIDERY.

Report.—Commended for skillful workmanship.

---

53. Swainson, Birley, & Co., London, England.

COTTON SHIRTINGS OR LONG CLOTH.

Report.—A good fabric, well bleached and finished.

---

54. Thomassa Lillo, Tucuman, Argentine Republic.

EMBROIDERED VESTMENT FOR PRIEST.

Report.—Commended for excellence in design, and fitness for purpose intended.

---

55. Carlos Ortells, Havana, Cuba.

EMBROIDERY,—PICTURES EXECUTED IN HUMAN HAIR.

Report.—Commended for artistic taste and skillful execution.

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56. Carlotta Mathilde Teixeira, Funchal, Island of Madeira.

EMBROIDERY, COMPRISING SKIRTS, WAISTS, AND EDGINGS.

Report.—Commended for good taste in design, together with excellent workmanship.

57. **Benjamin Zorilla, Salta, Argentine Republic.**

PONCHO.

Report.—Commended for excellent fabric, and fitness for purpose intended.

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58. **Mrs. Josefa G. de Cossio, Corrientes, Argentine Republic.**

EMBROIDERED TOWEL.

Report.—Commended for skill in design and execution.

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59. **Mrs. E. G. de Gallaraga, Corrientes, Argentine Republic.**

EMBROIDERED HANDKERCHIEF.

Report.—Commended for good taste in design, and skill in workmanship.

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60. **Theodor Müller, Berlin, Germany.**

HATS.

Report.—A good exhibit, displaying excellence in material and finish.

---

61. **S. Kobayashi, Tokio, Japan.**

LEATHER WORK OR FANCY LEATHER.

Report.—Fine dressed skins, printed in beautiful colors and designs, well adapted for furniture coverings, etc.

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62. **Frederick Fourastié, Caracas, Venezuela.**

COAT CHART.

Report.—Commended for a novel and ingenious system for taking measures.

---

63. **George Adler, Buchholz, Germany.**

FANCY BOXES AND BASKETS FOR JEWELRY, BONBONS, ETC.

Report.—Commended for tasteful designs and excellent construction.

---

64. **Sophie Hesselbein, Berlin, Germany.**

SILK EMBROIDERY.

Report.—Commended for excellent taste and skillful workmanship.

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65. **Heinrich Kuehn, Berlin, Germany.**

EMBROIDERY AND EMBROIDERY PATTERNS.

Report.—A good exhibit, displaying excellent taste in designs for needle work.

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66. **G. P. Festa, London, England.**

CORSETS.

Report.—Commended for novelty in construction and excellence in general finish.

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67. **W. S. Thomson & Sons, London, England.**

CORSETS.

Report.—Commended for high degree of excellence in shape and general workmanship.

68. **Natanson & Hurwitz, Berlin, Germany.**

FELT SHOES.

Report.—Commended for economy in cost and fitness for purpose intended.

---

69. **Anselmo Incerti, Modena, Italy.**

CAPS.

Report.—Commended for economy in cost and fitness for purpose intended.

---

70. **Pietro Vaiani, Milan, Italy.**

PERSIAN AWNINGS.

Report.—Commended for quality and economy in cost.

---

71. **G. U. Huerlin & Co., Stockholm, Sweden.**

MILITARY CLOTHING.

Report.—Clothing on figure of officer. Commended for good workmanship and fit.

---

72. **"La Paz" School of Embroideries, City of Mexico, Mexico.**

EMBROIDERIES.

Report.—A large and superb exhibit, displaying a high grade of excellence in workmanship.

---

73. **Teresa di Lenna, Udine, Italy.**

NEEDLE WORK.

Report.—Commended for artistic merit and skillful handiwork.

---

74. **Gaetano Fagioli, Piacenza, Italy.**

FANCY BOXES FOR JEWELRY AND BONBONS.

Report.—Commended for tasteful designs and good workmanship.

---

75. **Firmin & Sons, London, England.**

BUTTONS AND MILITARY ORNAMENTS.

Report.—A large and superb display of metallic buttons for army, navy, and civic uses. Commended for excellent design and finish.

---

76. **Heymann & Alexander, Nottingham, England.**

LACES, BOBBINETS, QUILLINGS, AND CURTAINS.

Report.—A good exhibit, displaying excellence in general finish, especially of curtains.

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77. **Cornellini & Buratti, Bologna, Italy.**

CORSETS.

Report.—Commended for economy in cost and fitness for purpose intended.

---

78. **John English & Co., Feckenham, near Redditch, England.**

NEEDLES AND SOLID HEAD STEEL PINS.

Report.—A large and complete exhibit, showing needles of superior strength and finish; solid head steel pins of excellent work and finish.

79. **Sangster & Co., London, England.**

PARASOLS AND UMBRELLAS.

Report.—A large and varied collection of umbrellas, shades, and parasols, superb in design and excellent in construction.

---

80. **Miss Adele Gerosa, Milan, Italy.**

EMBROIDERY—PICTURE OF LARENTI.

Report.—Commended for artistic taste and skillful work.

---

81. **G. A. Beckh, Nuremberg, Germany.**

SILVER AND GILT THREAD, AND FINE WIRE SPANGLES.

Report.—A handsome exhibit of fine workmanship.

---

82. **August Straub, Prague, Austria.**

GLOVES.

Report.—Commended for excellence in material, form, and workmanship.

---

83. **Candido Angeli, Luzzara, Italy.**

CHIP HATS.

Report.—Commended for economy and fitness for purpose intended.

---

84. **Ponti Rovera & Co., Piacenza, Italy.**

BUTTONS OF VEGETABLE IVORY.

Report.—A good exhibit, displaying excellence in patterns and general finish.

---

85. **The King of Spain, Madrid, Spain.**

TAPESTRY.

Report.—Commended for excellence of design and superior workmanship.

---

86. **Locher Brothers, Speicher, Switzerland.**

MACHINE EMBROIDERY.

Report.—A fine product combined with economy in cost.

---

87. **Mrs. Angiola Romani, Cremona, Italy.**

EMBROIDERY ON WHITE SILK.

Report.—Picture, "The Muse Euterpe," black silk embroidery on white silk ground, expressive and well drawn.

SIGNING JUDGES OF SUPPLEMENT TO GROUP X.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

B. F. BRITTON, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 39, 40, 42, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 72, 73, 74, 75, 76, 77, 78, 79, 80, 82, 83, 84, 86.

COLEMAN SELLERS, 34, 37, 38, 41, 44, 71, 87.

H. H. SMITH, 81.

EDWARD CONLEY, 85.

United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP XI.

EDITED BY
FRANCIS A. WALKER,
CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1877.

Entered, according to Act of Congress, in the year 1876, by the
CENTENNIAL BOARD OF FINANCE,
In the Office of the Librarian of Congress at Washington.

SYSTEM OF AWARDS

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

* * * * * * * * * * *

Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respectively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP XI.

JUDGES.

AMERICAN.	FOREIGN.
MARTIN P. KENNARD, Boston, Mass.	G. H. HEAP, Tunis.
PETER GOTTESLEBEN, Denver, Col.	ROULLEAUX DUGAGE, France.

The following named Judge was temporarily assigned from Group XV. to assist in the examination of the classes attached to his name.

JULIUS DIEFENBACH, Germany.—Jewelry, silver and plated ware, fancy goods, gems, and enamel painting.

GROUP XI.

JEWELRY, WATCHES, SILVER-WARE, BRONZES, ETC.

(*See also Group XXVII.*, ART.)

CLASS 253.—Jewelry, and ornaments worn upon the person.

Diamonds, and other precious gems, mounted singly or in groups,—head-dresses, "tiara," necklaces, rings, pins, etc.

Pearls, pearl and coral sets and ornaments.

Gold ornaments,—rings, pins, necklaces, chains, bracelets, buttons, etc.

Cut and engraved stones.

Gilt goods, metal and other ornaments, and imitations generally.

Watches,—their mounting and decoration,—regarded chiefly from the ornamental and commercial point of view. (For "movements" and chronometric qualities, see also Group XXV.)

CLASS 218.—Silver-ware and silver-plate,—hollow-ware, plain, embossed, engraved, or otherwise ornamented.

Silver and silver-plated knives, forks, spoons, etc.

Ornamental silvered bronze and metal work generally. Bronzes and "mantel ornaments," decorative clocks, etc. Enamels, etc. (See Group XXVII.)

GENERAL REPORT

OF THE

JUDGES OF GROUP XI.

INTERNATIONAL EXHIBITION,
Philadelphia, 1876.

PROF. F. A. WALKER, *Chief of Bureau of Awards:*

SIR,—Herewith I forward to you the general report of the Judges of Group XI.

Very respectfully yours,
M. P. KENNARD, *Chairman.*

GROUP XI.

JEWELRY, WATCH-CASES, SILVER-WARE, BRONZES, ETC.

The Judges of Group XI. were assigned a somewhat wide range of industries, their classifications leading them through varied productions of utility up to the Fine Arts. In gems, in gold and silver work, in artistic bronze, and in the enameler's and the lapidary's arts, the exercise of their judgment was called into a more diversified and difficult path than if they had been given any single and special manufacture, however extensive its relations.

They entered upon their labors at as early a day as possible, their number being at first incomplete, owing to the non-arrival of expected foreign members. Their work was attractive, however, and their action always harmonious. They had their surprises and disappointments,—the former at the delightful and varied affluence of such exhibits as those of Russia and Japan, the latter at the scantiness of the French section in comparison with French ability, and the absence from the United States department of many of those workers in the precious metals who, in their supply of the American trade, have distanced the world. It was fitting that more of these prominent manufacturers of gold and silver goods should have shown, through the courts of this Exhibition, the evidences of their genius and industries.

Jewelry.

In their absence the Exhibition failed to represent, particularly in the department of jewelry, the existing abilities of the country, and it is to be regretted that their places were filled by inferior representatives, many of whom, because located adjacent to the Exhibition, were enabled to occupy their positions at small expense. When we seek for the reasons for such absence, we suspect a disinclination to publicly display patterns, where so little respect is paid to another's property in any novelty of design, and where the recording and pro-

tection of trade-marks seem not yet to have been set up as established rules of the trade.

It may also be said that the more important manufacturers have often their own peculiar trade; and the markets for their goods, and in some cases their patterns, are controlled by their various customers, the merchants, to whom they confine themselves, for mutual advantage. To these drawbacks may perhaps be added the depressing influences of two disastrous years, unexampled for their detriment to this trade, and in consequence a large and general reduction of force, and falling off in the production of novelties. It is proper to say here, however, that the better examples—though few—of American jewelry equaled those of any other nation as to display of taste, mechanical execution, or quality of material. They are better adapted to American demands, and the evidence of this is in the small quantity now imported. American gold chains and necklaces, also collarets and band bracelets in the Roman and Etruscan manner,—styles now in vogue,—are specially notable as of admirable character, and none exceed them for beauty of design or workmanship. The same may be said of lockets, and has been said of our gold and silver watch-cases for years past.

Without entering into dry statistics, it may be interesting to mention that, according to the data of 1871, the last year of the war tax, the jewelry manufacture at Newark, New Jersey, alone, upon which that tax was paid, amounted to eight millions of dollars, and in the city of New York, the same year, it was between six and seven millions. The number of working jewelers in the United States is estimated at twenty-five to thirty thousand; of these Massachusetts has about fifteen hundred; Rhode Island, chiefly in the city of Providence, twenty-five hundred; Newark, New Jersey, about sixty establishments, and nearly twenty-five hundred workmen; and the city of New York about six thousand workmen. In some of the jewelry manufactories are employed, in ordinary times, from three hundred to four hundred men. There are also in the United States about twelve thousand watch and jewelry stores of importance. Connected with these is always a force of watch-repairers and working jewelers adequate to the business of each individual establishment. In the present stagnation of a trade which is especially sensitive to times of depression, there has followed, of course, a marked reduction in the volume of business; to what extent it is now very difficult to reach conclusions with any degree of accuracy, nor is it essential here.

Silver-ware.

In the precious metals, however, it was manifest that our chief strength was in silver-ware, for which America has made large demands in late years; indeed, the displays of American silver-ware excelled all others, and were among the distinguished attractions of the Main Building. It is evident that the great production of this metal, and the unprecedented demand for silver utensils in the United States, have stimulated manufactures in this branch of mechanical art, and that a growing æsthetical taste insists upon the highest possibilities. Without aspiring to the exhibition of marvelous essays of human ingenuity and artistic skill, which, when completed, are only monuments of the patient and inexhaustible labor of some gifted and exceptional artist, and void of real utility,—if we except a few prize- and race-cups, and one or two more ambitious testimonials and symbolical centre-pieces, or vases,—the American silver exhibits were generally more practical in character, artistic in detail, of higher elegance, and of superior grade of work. We should note also, from several important establishments of the United States, distinguished examples of the "hard," or silver-soldered and electro-silver-plated upon nickel or German silver ware, for table and general domestic use, especially praiseworthy for enduring quality, finish, and good taste; indeed, no better goods of this class were on exhibition than some of these specimens.

In the soft metal, or tin-soldered ware, known as plated upon Britannia-metal goods, for like domestic purposes, there was a liberal representation of a large and extending industry. Since the development of the electro-plating process, this peculiar metal trade has obtained more prominence in the United States than even in the English markets. From its facility and cheapness we have more manufacturers and consumers of this ware than any other nation, and our products in this branch of metal-work are finding a considerable demand from abroad. There is need, however, of a higher standard of design. With but few exceptions, our goods of this character lack simplicity and soberness of decoration, and more attention to outlines and beauty of form is desirable.

It may be answered that this is cheap ware; but with metal so facile it need not lack grace in shape, or be inartistic or vulgar. Too many of the examples were marked by a garish taste, a prominence of ornamentation void of significance, and a profusion and confusion of ungainly bodies, handles, legs, and spouts, a jumble of materials often incongruous, without unity, elegance, or originality. There was

also too much suggestion of traditional styles, and a kind of mill-work that is monotonous. If the uncultured of our Western frontier trade demand the meretricious, it does not follow that the taste of these people need be further perverted by coarse designing. As in many other manufactures, it is time we had an art and a series of patterns more distinctly our own, and that our productions in this metal should not always suggest to those at all conversant with the trade the débris of the Sheffield and Birmingham work-shops of former days. The character and quality of these goods may be deemed honest for the price, and our technical processes are well advanced; but an improvement in styles must be sought if it is desirable to augment foreign demand, or reap that harvest in the markets of the world to which metal-ware of such popular utility is entitled.

In the line of electro-plated flat table-ware, known as rolled goods, viz., knives, forks, spoons, and numberless pieces of a kindred nature, there is an immense production in the United States. These forks, and in some cases the knives, have superseded ivory-handled goods, so liable to crack in our dry climate and with our indifferent domestic service. A set of steel dies or rolls for making a suite of these goods of each pattern involves no inconsiderable outlay, and but a few years since only a few patterns were in use. Then the London market could only furnish the "king's pattern," the "shell pattern," the "thread pattern," and perhaps one or two others, and these were made mostly in solid silver. Now there are many American manufacturers who furnish a greater variety of their own designs than were then extant, and absolutely compute their production in tons rather than by the gross.

It may be germane in this connection to allude to the difficulty experts or others experience in determining the quality of electro-plated articles. It was at this point that the Judges were sometimes compelled to hesitate in characterizing quality. The amount of silver deposited is often one of the trade mysteries. The only conclusive test would have been to "strip" or assay in their presence such doubtful articles, and thus to determine the exact amount of silver, as also the quality of the nickel-silver basis upon which the silver is deposited, which is not feasible in such an Exhibition. At the manufactory such are weighed, in and out of the plating process, and if there be six or sixteen ounces upon the work it is manifest in the scales, and there only; so that much has to be taken for granted, and it is easy for unscrupulous manufacturers to foist poor goods upon the market.

Nickel-Plating.

Nickel-plating by the electro process is slowly making its way to meet the requirements of our domestic life. Being somewhat grayer in color, it perhaps may not be so popular with the housekeeper as the acceptable whiteness of true silver-plating, yet it has some advantages unknown to its more aristocratic rival. With a relative cost of about one-fifth less than silver-plating, it presents a harder surface, less liable to be defaced, does not oxidize under the action of impure air, and therefore requires less care. For hotels, hospitals, and ship and steamboat use the exhibits of this ware impressed the Judges for their economy and service. In the earlier stages of electro-plating the electro-deposition of nickel was found to be more difficult than the other metals. It did not uniformly adhere, and was treacherous and uncertain in its action. To obviate this, in some cases it was found needful that the article to be plated be first given a slight coating of copper, as for this metal the nickel has a more ready affinity. The whole difficulty, however, was at last overcome by the discovery of the process patented by Dr. Isaac Adams, Jr., in Boston, Massachusetts, in 1869. It has augmented the use of this metal for plating purposes, and, as the method was not known previously, it is practically an American art-industry. The ordinary nickel-plated hollow-ware is upon a basis of planished tin, or of britannia metal, and also upon "nickel-silver"; but this coating with nickel enters into other and manifold purposes, and renders it an important factor in the utilization and improvement of metal-work for household use, and in a broad field of other service.

Bronze of Art.

In the production of true bronze, known as the bronze of art, saving a colossal marine group for the Lincoln monument at Springfield, Illinois, from the Ames Foundry at Chicopee, Massachusetts, and a few ornamental pieces and decorative mountings for marble mantel-clocks wanting in originality, the American sections gave but little evidence of vitality. Our art-life in America has been short, our historic figures few, and our art museums as yet meagre in examples for study or for repetition. In this branch we depend upon European copies and reductions from the classic models of Greek and Roman art. The time is coming when our native birds and animals will be thus modeled and preserved; and there are many incidents in our civil, our military, and our Indian history which furnish admirable examples for illustration in enduring bronze, and may thus be perpetuated in objects of house-

hold art. We need the educational influences of such depositories as the Kensington Museum in London, or the Louvre in Paris, to stimulate the imagination and inspire the taste and action of our artisans in such metal-work as well as in other branches.

Imitation Bronze.

There were also a few examples of zinc imitations of art-bronze objects, the models chiefly copied from the French makers. These are cast whole as a "cone," and painted and colored superficially, or covered with an electro-deposit of copper, and then artificially bronzed to simulate the genuine at comparatively little cost. It may be said here that the public do not always discriminate between this work and true bronze. Such are advertised, and often sold as bronze, and sometimes as "French bronzes,"—perhaps not always with deceitful intent,—whereas they are but brittle spelter or zinc, and bear no more relation to the real than a coarse chromo does to an original oil-painting. This is, however, a new and growing branch of metal-work, and, with enterprise and good taste, will find ample compensation and a large field.

GREAT BRITAIN.

The labors devolved upon this group by exhibitors from Great Britain were not arduous. There were representations from London, Birmingham, Liverpool, Edinburgh, Belfast, and Dublin, the most important of which was the distinguished and comprehensive exhibit of solid silver and electro-plated metal-work by Messrs Elkington & Co., of Birmingham. This establishment maintained here its distinction for the high character of its artistic work in metals. Their examples ran through the whole gamut of the trade, from articles for simple domestic purposes up to their most ambitious productions, some of these being veritable art-pictures, and apparently the culmination of human ability in metal-work, the excellence of which has been acknowledged in former Exhibitions. Among the branches of this industry more recently developed by this house is that of damascening and inlaying of various metals, the specimens of which were admirable novelties; also, a simulation of the better examples of Japanese work in incrustations, both ingenious and complete; with, also, the processes both of cloisonné and champ-levé enameling, only recently introduced into Europe from the Eastern nations. Their essays in this decorative and artistic work were unrivaled for freedom of design and quality of color and finish. The horological portion of the English section was liberally represented by the best of the

English trade, there being many familiar names of great repute among the watch exhibitors, both from London and Liverpool. For the treatment of this department, as to chronometric qualities, reference is made to the report of Group XXV. The other British exhibitors displayed chiefly miscellaneous contributions, but were notable also as representing such specialties as manufactures of Scotch pebbles set in silver as jewelry, bog-oak carvings and ornaments, Whitby jet goods, and the like, in their peculiar provincial individuality. They showed also admirable examples of jewelers'-work in gold and gems, but generally of that conventional and massive-appearing character which does not now find a responsive taste or a market in the United States.

RUSSIA.

Russia presented to the attention of the Judges an admirable and profuse display of fascinating examples of her manufactures in gold and silver, in fine bronze, and in articles made of Russian ornamental stones. There were many novelties in her court that were a revelation to an American. The remarkable silver-ware so amply displayed by Sazikoff and others, both from St. Petersburg and Moscow, with specimens of repoussé and chiseled effects, and the peculiar representations of linen and damask in this metal, with the radiant beauty of the gem-like enameling upon gold and silver and gilded silver utensils in Greek, Byzantine, and Russian taste, were such marvelous illustrations of the capabilities and truly artistic fancy of Russian artisans as would have awakened the enthusiasm of a Benvenuto Cellini and that of the historical Palissy, the famed enameler of Limoges. There was much of ingenious and pleasing caprice in the novelties in silver and in the gold jewelry and niello-work that were suggestive to the American workers in the precious metals. The jewelry by Adler, of Moscow, being of gold mosaic or damascene-work, with the metal of varied alloys and colors so combined and welded as to produce delicate effects with different grades of shading, was an original and decided novelty. The bronzes from Felix Chopin, from St. Petersburg, by the artist Lanceré, though few in number were refreshingly original, of native subjects, so well modeled and of such artistic delicacy and expression as to add lustre to this inviting section, and always find appreciative observers. An attractive specialty of Russian art is the working by veneering or inlaying of such of their ornamental stones as malachite, lapis lazuli, labradorite, etc., into articles for personal ornament, and also for luxurious furniture, as mantels, tables, vases, and smaller objects of household decoration.

There were many of these that were strange and attractive, showing skillful work, and, in their peculiarity, unexampled in the Exhibition.

CHINA.

The Chinese department was conspicuous for a large and interesting collection of decorated enamel utensils, vases, and ornamental articles in the cloisonné manner, both of ancient and modern Chinese work, for which the Commission were indebted to the consideration and generous public spirit of Hu Kwang Yung, a high official and banker of Hangchow. This section contained also various and curious bronzes, mostly of ancient and grotesque character, with some specimens of silver-work and gold ornaments by native artisans that were characteristic, though without especial claim to novelty.

JAPAN.

Japan gave us an imposing display of great excellence, and a gratifying surprise, in the remarkable bronze productions which were so attractive for their diversity and elaborate richness. In form, composition of metal, inlay-work, casting, chiseling, and ornamentation the Japanese have in general not only a distinct art and character, but each of their artisans, as illustrated by this Exhibition, seems to maintain an individuality, taste, process of composition, and, indeed, a peculiarity of metal distinctly his own, evidencing an extraordinary versatility, and a distinctive independence which our own metal-workers would do well to emulate. Their exhibits which came under the attention of the Judges of Group XI. were principally ornamental or decorative objects in bronze, as vases, censers, garden- or temple-lanterns, and jardinières, including also some delicate tea- and other table-ware suggestive, in some respects, to our own manufacturers and worthy of attention. The Japanese are adepts in alloys and in applied decorative combinations of gold, silver, and copper in incrustations, and in ingenious management of party-colors. In these metals they illustrate a luxurious prodigality of fanciful invention, which is in marked contrast with our own poverty in this branch of artistic metal-work. But however rich in fancy these examples of Japanese industrial art may have been, they were not uniformly so good in the mechanical qualities. They were often lacking in symmetry and mechanical perfection. Their pairs of vases, for example, were not always uniform in shape, being imperfectly matched as to measurements and relative proportion, a quality which with us is produced by turning-lathes and other engines of our own unerring mechanism,

evidently not at present availed of by the Japanese artisans. In the vitreous enameled metal-ware, known as the cloisonné, they showed but comparatively few examples, and these, however elaborate and painstaking, were often deficient in the treatment and in the purity of their enamel, and weaker in the quality of color than the best English specimens of this art. The Commission are especially indebted to M. Marunaka, of Kanazawa, province of Kaga, for many valued contributions to the Exhibition, which, however, being of a collective character, the regulations do not permit this group to further recognize with an award.

FRANCE.

France, as compared with other nations, sent us a goodly number of representatives; but when we recall her fertile artisans and the ramifications of her many industries, when we remember that she leads the world in artistic and purely ornamental metal-work, in decorative furnishings, and in all articles of luxurious fancy, we are constrained to believe that her resources were not adequately represented in our Exhibition. One recognized at intervals some of her best productions, and yet found they but insufficiently suggested the manifold attractions of Paris. There was a dearth of those attractive Parisian specialties for which the United States have been such ready customers; and in those faithful mechanical reductions in bronze of the many historical subjects and classical remains of antique art which would have been of great interest, the paucity of the display was much to be regretted. In point of fact, many establishments prominent for their productions in bronze were unrepresented. In ware electro-plated with silver, and galvano-plastic articles for domestic use, there was also a palpable dearth; yet the French department was an extended and attractive one, of such great variety that it should not be under-estimated. Their gold-workers presented some notable examples, Boucheron and others, of Paris, displaying superb productions of rich jewelry with rare gems and brilliant enamels. These contributions illustrated many periods, and, whether in obedience to the exacting extravagance of modern demand or in the faithful rendering of the best of the Roman or the Egyptian age, were of the very highest artistic and material merit. This section was also diversified with attractive exhibits of bronze, brass, and gilt art-work, champ-levé enameling, portable and mantel time-pieces, and mantel and other rich furniture. Marchand exhibited a remarkable chimney-piece of Greek style, with a central figure of Minerva in bronze, which was a masterpiece in its way. This section was also rich with palatial furnishings, by Cornu & Co., of Algerian onyxes

and variegated marbles tastefully mounted in bronze. There were also collective reproductions of small antique objects in bronze of Pompeian character, and numerous other branches of Parisian fantasy, many of which, being imitations and of a finical character, were not inspiring acquisitions.

GERMANY.

From Germany there were many representations of those industries whose classification brought them to the attention of the Judges of Group XI. These included several with productions in silver for household service, of original and attractive character, and unlike any other examples in the Exhibition. There were also galvano-plastic or electrotype copies of those remarkable silver utensils and *paterœ* of ancient Rome known as the "Treasures of Hildesheim," in solid silver and in baser metal, interesting not only as exact repetitions of high art work, but as valuable illustrations of the advantages of this process of depositing by galvanic action, and thus precisely reproducing the most elaborate work. The German manufacturers made a good display of electro-plated wares, and their oxidized silvered goods gave evidence of more attention to productions of this specific character than appeared in other sections. Some two or three manufacturers exhibited copiously of galvano-plastic and zinc composition, models of monuments and public characters in German history, in the manner of real bronze, the casting followed with a superficial covering of copper, and then bronzed or colored, which were rather inartistic in character and devoid of sharp and expressive outlines, but of moderate cost. Perhaps the most noticeable feature of the German department of the Main Building was the jewelry and goldwork. There were several interesting collective exhibits which included the productions of many combined manufacturers. These were chiefly from Hanau, Pforzheim, and Swabian Gmünd, for many years the homes of much of this industry. All the grades were here, from the better examples of European work (but mostly of the fourteen-karat quality) to the lightest and the cheapest adaptations to the requirements of their specific markets. It may be inevitable from familiarity, but one who is in any degree conversant with these goods is inclined to wish for more frequent departures from long-wonted styles. A stray scholar from some school of design should be acceptable to some of these manufacturers; fresher ideas and new dies would be less suggestive of automatic work, and perhaps bring needed flexibility and a livelier trade. France and Germany have of late years drawn away from Italy much of the business of cameo-cutting. In this art

there was a collective representation, with some excellent specimens from Idar-Oberstein, the present location of much lapidary and glyptic industry.

ITALY.

The Italian department was somewhat barren of the best samples of Italian ability. With the exception of praiseworthy examples of fine jewelry and gold-work by Bellezza, some fascinating reproductions of the Greco-Etruscan period by Castellani, silver filigree-work from Genoa, a little really fine coral from Naples, and a few artistic bronzes of classic mould,—statuette reductions from the antiques by Boschetti, of Rome,—it gave us little of striking importance, and but the average of the sales-rooms and the shops of Florence, Rome, Naples, and Genoa. This section bore rather the character of a bazaar than of an Exhibition, and it seemed evident the exhibitors had thus calculated. There are many attractive specialties of Italian art that are inviting to the stranger which were looked for in vain. In a word, they gave us copiously of their merchandise, but not much of their most esteemed art.

AUSTRIA.

Austria sent us specimens of her fine jewelry and some admirable gold-chainwork, with imitation jewelry and false stones of many sorts; also, many examples of small gilt and bronze metal articles of varied fancy and purpose. These chiefly came from Vienna. There was also a liberal display of the Bohemian garnet jewelry, a peculiar manufacture of that province. These stones are set in a red composition of copper and gold, and when thus mounted are of moderate cost. At times these ornaments have been an important element of trade, and now, for almost an indefinite period, have come to us without material change of patterns. If those interested in this manufacture desire the business to survive in the American market, it would be advisable to stimulate it with some new ideas and designs.

SWITZERLAND.

Switzerland displayed some superb jewelry and gold-work, and also exquisite enamel paintings set as jeweled ornaments and pendants, especially noticeable; and her ingenious artisans here maintained their renown for fine watches of many styles, with skillful engraving and tasteful ornamentation in decorating and casing them.

NORWAY, DENMARK, AND SWEDEN.

These countries each presented interesting contributions, but mostly manufactures of silver. The silver filigree-work from Norway was of distinguished excellence.

PORTUGAL.

Portugal also gave us several exhibits of silver-work, chiefly of filigree ornaments of mediocre character.

EGYPT.

To the Egyptian National Museum we were indebted for specimens of Egyptian industry in gold and silver filigree.

BELGIUM.

Belgium illustrated the value and quality of her black marble, in examples of decorated mantel-clocks, with movements of French manufacture.

SPAIN.

From Spain the only exhibitor who claimed the attention of the Judges of this group was P. Zuloaga, of Madrid, whose specialty is the incrustation of metals, and who displayed caskets, vases, salvers, and many other articles of ornamental work in iron, enriched with gold and silver inlay and damascene-work, rendering them quaintly ornamental and quite exceptional in character. This collection had the flavor of the mediæval age, and suggested an epoch when time was not money.

TUNIS.

To his Highness the Bey of Tunis we were indebted for examples of Tunisian ornaments of various descriptions for personal wear, and of interest for their novelty.

INDIA.

From India we had the interesting contributions of Messrs. Watson & Co., of Bombay, comprising rich gold and silver ornaments, skillfully made of filigree, and fine gold repoussé native work of remarkable character, with a utilization of tigers' claws neatly mounted in gold for feminine adornment; also, silver cups and other utensils exquisitely wrought.

TURKEY.

Turkey, through her representatives from Albania, Trebizond, Aleppo, and other centres, exhibited many characteristic articles of rich fantasy, such as rich enameled coffee-cups, caskets, jewel-cases, and other articles of silver filigree-work, Albanian niello enamel specimens, damascene-work in iron, with cutlery of Damascus steel, and various articles for personal ornament, Oriental in taste and of curious interest.

BRAZIL.

Brazil sent us a few examples of jewelry and manufactures of gold, with an elaborate display of her peculiarly brilliant insects, variously mounted as jewelry and decorative ornaments for personal wear.

It is to be regretted that some prominent exhibitors of rich jewelry and silver-ware were, by the needful regulations of the Centennial Commission, debarred from such distinctive awards as would have been commensurate with the admirable and meritorious character of their varied displays. Of those exhibitors, Messrs. Bailey & Co. and Caldwell & Co., of Philadelphia, and Messrs. Starr & Marcus, of New York, are conspicuous. Being merchant jewelers, their exhibits were of a collective character, including other than their own manufactures, and as such necessarily non-competitive, but their attractive sections cannot have failed in public appreciation.

WATCHES.

Watches were referred to Group XI. to be regarded chiefly from the ornamental and commercial point of view, their movements and chronometric qualities being left to the consideration of the Judges of Group XXV.

The treatment of this subject leads one at once to the exterior attractions of this useful pocket mechanism. It is proverbially an ungracious privilege to be the recipient of the shells, while another regales himself with the luxurious bivalve; but, as sometimes the pearl of the shell is of more value than the meat, so it may be with—in this age—that very important companion of mankind, a watch: the case can be of more value than the movement. Dropping the metaphor, watch-case-making in the United States has for nearly half a century been an important and increasing branch of gold and silver work. For the specific American trade American-made watch-cases were preferable to foreign ones, because they could be better and more

readily adapted to the exacting fancy and varied and independent tastes of Americans; and from the earliest introduction of this manufacture they have not suffered by comparison with foreign work. There was, besides, economy in avoiding an exorbitant tariff by importing only the watch-movements and casing them here. With increased demands great improvements have been made in the technical processes of this work, the aid of novel machinery evoked, and the cost of production materially reduced, placing them at prices beyond all foreign competition.

Many watch-case-making establishments now find employment for a large force, the most important of which are those connected with the several watch-manufactories at present in operation; one of these, the Waltham (Massachusetts) Company, for example, having an average monthly product of 5000 silver cases, and upwards of 1500 gold ones. Nor are the results of this branch of manufacture produced wholly by the aid of machinery. It gives employment to numerous skillful artisans, as engravers, enamelers, and their like. The American watch-cases so copiously displayed in the Exhibition, for mechanical qualities, finish, decorative engraving, and varied ornamentation, were generally of the highest excellence, and also remarkable for their diversity of patterns.

In no department of the business during the present generation has there been a more radical change than in that of the watch trade, whether we consider the locality of the sources of supply, the character and the styles of the goods, or the mechanism and principles employed in the construction of the movements. In earlier times English watches well-nigh held the markets of the world. Within the last three or four decades Coventry supplied the cheap grades, Liverpool and Prescott furnished a better class of more trustworthy and substantial work, and the London makers produced chiefly the highest quality and most accurately adjusted mechanism. A London watch was then the synonym for a satisfactory time-keeper. Subsequently all these in a great degree yielded to the lighter styles, more attractive, equally trustworthy, and more economical productions of the Swiss makers.

The lower grades of English work at first disappeared, their verge-escapements following the sun-dial and the clepsydra into desuetude, the Swiss watches supplanting them both in the United States and, to a great degree, in their own home markets. While the inferior English watch-work thus suffered, the Swiss makers were advancing with their improved escapements and tasteful and more inviting and diversified patterns of the very highest grades of complicated movements and

adjusted work, which rivaled, and in some markets long since superseded, many of the best London names; so that, with the exception of a very limited number of well-reputed and exceptional makers, the demand for English watches has now ceased in the United States. Switzerland enjoyed for many years, without much interruption, the advantages of this large and profitable field, particularly as regarded the trade with America, but the present tendency is to an absolute reversal of former conditions.

In the march of events, and under the cheap production, mathematical precision, and interchangeability of parts of the watches now made by American machinery, the Swiss makers are sensibly feeling a diminution of American orders, and are preparing for the inevitable revolution foreshadowed by the acknowledged importance and perfection of the American system, so amply illustrated in the Philadelphia Exhibition. In point of fact, the United States, while ceasing to be customers, are becoming rivals, and are largely exporting watches in lieu of importing them.

It was the saying of an eminent London maker of former days,—whose various workmen of the many subsidiary trades needful in producing a watch under the old system lived away from him, and weekly brought to his establishment the varied detail of minute and delicate parts that went to make up the complete mechanism,—the jewelers, the escapement-makers, the pinion-makers, the springers, and the other numerous auxiliaries,—that "no watch would ever be properly and perfectly made until they could be wholly produced under one roof!" This point is now reached. From Nuremberg to Waltham it has taken four hundred years! Of the half-dozen watch-manufactories at present operating in the United States upon this system, there were but two displays at Philadelphia, those of the Waltham (Massachusetts) Company and the company at Elgin, Illinois, the latter not being in competition.

In the earlier stages of American watch production the larger sizes were furnished, as being of the most popular character, and it was sometimes held against the machinery system that it did not permit such flexibility as to range of sizes as with the hand-made watches, where only six or twelve of any optional calibre were carried along together in the process of manufacture. This is now obviated; for the Waltham Company exhibited many sizes, ranging from the smallest useful sizes suited to ladies' wear to the maximum sizes for the use of gentlemen. As has been intimated, the popular American fancy has hitherto been for larger sizes than were used abroad. There is a perceptible change in this taste, and also in the demand for what

are known as hunting-cases. The latter was greatly stimulated by the requirements during the decade succeeding the California exodus, so as almost to set a fashion, but they now seem likely to be replaced by the lighter and more convenient open-face finish. One of the most advantageous improvements of late years, for the convenience of the wearer and the durability of the watch, is the invention of winding in the stem. Faulty at first, this admirable mechanism has been so perfected as to soon render all key-winders obsolete.

The advent of steam in traveling has generated a more rigid necessity for promptness than in former days, and has created a demand for the higher and more expensive grades of movements, and rendered nearly useless all cheap pocket time-keepers. But it is evident that the markets of watch-demanding countries are not to be quietly possessed by these American manufacturers. Already organizations are on foot abroad both as to the production of watch-cases and watch-movements, upon the American idea and under American superintendence, so that competition—that inspiring force in human activities—is still to be an important factor in this interesting department of mechanical industry.

As a matter of information, it may be opportune to remark here, that gold articles of jewelers' work, both of ornament and utility, and many other productions of varied character related in some way to such mechanical artisanship, manufactured in the United States, have long found European and other foreign orders, and to these may, of late, be added silver and silver-plated wares, and gold and silver watches in constantly-increasing volume.

It is manifest that under the stimulating wealth of suggestion and educational influences of the International Exhibition at Philadelphia, new ideas and fresh enterprises are springing into the industries of the United States. The workshops and products of their artisans in various directions are already foreshadowing this, and it is desired that these advantages may in some measure be reciprocally enjoyed by the enterprising visitors of other lands who honored the Exhibition with their presence.

American agencies in European cities for the introduction of American manufactures are being established, which, but for the intelligence and experience elicited by the Centennial Exhibition, might have waited years longer for such demonstration.

REPORTS ON AWARDS.

GROUP XI.

1. **M. I. Valentin, Rio de Janeiro, Brazil.**

ORNAMENTS FOR PERSONAL WEAR.

Report.—He exhibits personal ornaments made chiefly of brilliantly colored Brazilian beetles and other insects, well mounted; also a gold snuff-box of tasteful design.

2. **Collective Exhibition arranged by M. Piel, Paris, France.**

JEWELRY.

Report.—A collective exhibition of imitation jewelry, arranged by M. Piel, containing the goods of MM. Piel, Topart, Levy, Jacquemin, Hémery, Mascurand, and Regad. Commended for good style, variety, and moderate prices.

3. **Petit-Pierre & Bryson, Geneva, Switzerland.**

JEWELRY.

Report.—Rich jewelry and fine enamel paintings, excellent in quality, style, and workmanship.

4. **Jean Gay, Geneva, Switzerland.**

JEWELRY.

Report.—Commended for his collection of watch chains and enamel lockets of good style and execution.

5. **Fritz Becker, Pforzheim, Germany.**

GOLD JEWELRY.

Report.—Bracelets of good design and execution.

6. **Geissell & Hartung, Hanau, Germany.**

GOLD JEWELRY.

Report.—Gold jewelry, medallions, and bracelets in Roman style; also diamond work and other gems of excellent execution.

7. **Heinrich Witzemann, Pforzheim, Germany.**

GOLD CHAINS.

Report.—Gold chains, necklaces, and lockets of good execution.

8. **Wild & Co., Pforzheim, Germany.**

MOURNING JEWELRY.

Report.—Mourning jewelry, gold jewelry, with pearls and turquoise, of good manufacture, at moderate prices.

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9. **Bizer Brothers, Pforzheim, Germany.**

GOLD JEWELRY.

Report.—A variety of gold rings of good execution.

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10. **August Gerwig, Pforzheim, Germany.**

GOLD JEWELRY.

Report.—Commended for great variety in lockets and designs.

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11. **Gschwindt & Co., Pforzheim, Germany.**

GOLD JEWELRY.

Report.—Mounted stone cameos of excellent execution.

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12. **Wilhelm Heidegger & Co., Pforzheim, Germany.**

GOLD JEWELRY.

Report.—Goods of fair quality at moderate prices.

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13. **Eduard Lay, Pforzheim, Germany.**

LOCKETS.

Report.—Medallions and lockets of good execution and at moderate prices.

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14. **Ernest Schönfeld, Jr., Hanau, Germany.**

GOLD JEWELRY.

Report.—Repercé jewelry set with gems, of good quality and execution.

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15. **H. Keller, Pforzheim, Germany.**

GOLD JEWELRY.

Report.—Gold rings of very good execution.

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16. **A. Voltz-Bier, Hanau, Germany.**

GOLD JEWELRY.

Report.—Etruscan jewelry of good finish.

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17. **G. F. Backes & Co., Hanau, Germany.**

GOLD JEWELRY.

Report.—Commended for their exhibit of fine jewelry of excellent taste and superior execution.

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18. **Dingeldein Brothers, Hanau, Germany.**

GOLD JEWELRY.

Report.—Commended for their interesting collection of gold jewelry of superior execution.

19. **Hugo Zeuner, Hanau and Berlin, Germany.**

GOLD JEWELRY.

Report.—Repercé jewelry of very good taste and execution.

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20. **C. W. Schehl, Hanau, Germany.**

ETRUSCAN JEWELRY.

Report.—Commended for his exhibition of fine jewelry in Etruscan style.

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21. **C. Hertel & Son, Hanau, Germany.**

GOLD JEWELRY.

Report.—Gold jewelry of various designs at moderate prices.

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22. **C. Bissinger's Sons, Hanau, Germany.**

GOLD JEWELRY.

Report.—Genuine jewelry of superior class and excellent manufacture.

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23. **C. M. Weishaupt's Sons, Hanau, Germany.**

GOLD JEWELRY.

Report.—Commended for jewelry of old Celtic style, originality of pattern, and neatness of execution.

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24. **Steinheuer & Co., Hanau, Germany.**

GOLD JEWELRY.

Report.—Repercé jewelry of high originality.

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25. **Pleuer & Co., Stuttgart, Germany.**

GOLD JEWELRY.

Report.—Commended for variety of good jewelry at moderate prices.

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26. **Gustav Hauber, S. Gmünd, Germany.**

SILVER JEWELRY.

Report.—Silver chains and chains with niello work.

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27. **Ottmar Zieher, S. Gmünd, Germany.**

GOLD JEWELRY.

Report.—Commended for his collection of Etruscan-style jewelry.

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28. **M. H. Neustadtl, Prague, Bohemia, Austria.**

JEWELRY.

Report.—Bohemian garnet jewelry of fine finish and moderate price.

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29. **M. Kersch, Prague, Bohemia, Austria.**

GARNET JEWELRY.

Report.—Garnet jewelry in great variety and of good workmanship.

30. Markowitsch & Scheid, Vienna, Austria.

JEWELRY.

Report.—Ornaments and articles in niello and enamel, of good taste and execution.

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31. Michael Goldschmidt & Son, Prague, Bohemia, Austria.

GARNET JEWELRY.

Report.—Bohemian garnet jewelry and ornaments, of a variety of designs and excellent workmanship.

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32. Giacinto Melillo, Naples, Italy.

ETRUSCAN AND GREEK-ETRUSCAN JEWELRY AND CORALS.

Report.—Commended for excellence of workmanship and truth. He exhibits corals and Etruscan and Greek-Etruscan jewelry. A pink coral necklace is especially deserving.

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33. Giovanni Boncinelli & Son, Florence, Italy.

JEWELRY AND MOSAICS.

Report.—Commended for creditable and tasteful workmanship. Their Florentine mosaics, medallions, caskets, and portfolios are commendable as of good character.

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34. Niccolo A. Bellezza, Rome, Italy.

JEWELRY.

Report.—Commended for high style of jewelry, excellence of taste, and superiority of workmanship. He exhibits a square necklace set with rubies, sapphires, and emeralds—a new design; a necklace of the Louis Quinze pattern, with cameos; a very fine brilliant, surrounded with rose diamonds; and an Egyptian necklace.

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35. Giovanni Ascione & Son, Torre del Greco, Italy.

CORAL JEWELRY.

Report.—Commended for good and artistic workmanship. Exhibit coral jewelry mounted in gold, coral pipes, cameos, and various articles in coral of good quality and artistic designs.

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36. Giojuzza Gibertini & Co., Naples, Italy.

CORALS.

Report.—Commended for beautiful display. They make a meritorious exhibition of pink, pale, and red corals.

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37. Otto Krumbuegel, Moscow, Russia.

JEWELRY.

Report.—Novelties in style and novelty in fabric; pierced open work in gold with enameling especially fine in character.

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38. John Tchitchelef, Moscow, Russia.

JEWELRY.

Report.—Gems, jewelry, necklace, and lockets, in Russian styles and of special excellence.

39. V. A. Adler, Moscow, Russia.

JEWELRY.

Report.—Superior jewelry of many styles, with finely-set gems in good taste; also golden mosaic jewelry. The gold being of varied colors and alloys ingeniously combined in the style of damascene work is entirely novel in character, effective in style, and of marked excellence and beauty.

40. William Gibson, Belfast, Ireland.

JEWELRY, GEMS, AND BOG-OAK ARTICLES.

Report.—An exhibition of fine jewelry and gems of high character, admirably set in special styles and with good taste; also a large variety of bog-oak articles of superior excellence.

41. James Aitchison, Edinburgh, Scotland.

SCOTCH PEBBLE JEWELRY.

Report.—An attractive display of Scotch pebble jewelry and ornaments of marked excellence, especially in Scotch taste.

42. Jeremiah Goggin, Dublin, Ireland.

BOG-OAK JEWELRY, WALKING-CANES, AND ORNAMENTS.

Report.—Manufactures of bog-oak, including jewelry and ornaments of this material, of varied designs and superior character.

43. Emile Philippe, Paris, France.

JEWELRY.

Report.—Artistic jewelry of very remarkable style and finish, especially necklaces, bracelets, earrings, and pins, in Egyptian taste, with ancient Egyptian scarabei.

44. Erhard & Sons, S. Gmünd, Germany.

GALVANOPLASTIC WORK.

Report.—Oxidized galvanoplastic jewel caskets and art castings of great variety and beauty of design and excellent execution.

45. F. Boucheron, Paris, France.

JEWELRY.

Report.—Commended for his most attractive exhibition of strictly fine jewelry and jeweled objects of art of the highest excellence; his rare gems, fine enamel work in brilliant colors, and exquisite articles of luxury.

46. Guyot & Migneaux, Paris, France.

JEWELRY.

Report.—Commended for an exhibition of small ornaments made with insects and feathers,—an ingenious specialty.

47. Ernest Fouchard, Paris, France.

JEWELRY.

Report.—Commended for the exhibition of ecclesiastical and theatrical ornaments, regalia, and imitations of weapons.

48. **Widow Audy, Paris, France.**

JEWELRY AND PEARLS.

Report.—Commended for the exhibition of imitation pearls of great perfection.

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49. **Murat, Paris, France.**

GOLD-PLATED JEWELRY.

Report.—Gold-plated necklaces, bracelets, medallions, and brooches of excellent design and superior work.

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50. **John C. Meyer, New Orleans, La., U. S.**

JEWELRY—GOLD WORK.

Report.—Gold and silver badges, medals, and jeweled prize decorations for societies, clubs, etc.; work of fine character, of original patterns, and in good variety.

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51. **A. Fornet, Bourg, Ain, France.**

JEWELRY.

Report.—Commended for specialty of jewelry and enamel work in Bressan style.

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52. **Hamilton & Hunt, Providence, R. I., U. S.**

ROLLED PLATED CHAINS.

Report.—Gold-plated chains, necklaces, and bracelets of rolled plate of excellent quality and finish.

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53. **Tiffany & Co., New York, N. Y., U. S.**

JEWELRY AND JEWELED WATCHES.

Report.—Commended for their specimens of jewelry, diamond work, and other set gems of dazzling richness and high quality of workmanship; also for watches of attractive styles with jeweled, engraved, and enameled decorations of excellence.

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54. **Alessandro Castellani, Naples, Italy.**

REPRODUCTIONS OF ANTIQUE JEWELRY.

Report.—A small but choice and very excellent display. He exhibits reproductions of antique gold jewelry set with genuine antique intaglios; also imitations of antique gems.

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55. **Bolzani & Füssl, Vienna, Austria.**

JEWELRY OF GOLD.

Report.—Gold chain work of good finish and great variety of patterns.

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56. **Derby Silver Co., Derby, Conn., U. S.**

PLATED GERMAN-SILVER TABLE WARE.

Report.—A large variety of patterns of knives, forks, spoons, and other table utensils, good in design, and of excellent finish and quality.

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57. **H. F. Barrows & Co., New York, N. Y., U. S.**

GOLD-PLATED GOODS.

Report.—Gold-plated articles of ornament, chains, necklaces, and lockets, of good general character in style and of excellent finish.

58. Holmes, Booth, & Haydens, Waterbury, Conn., U. S.

SILVER-PLATED GOODS.

Report.—A good display of electro-plated on nickel silver knives, forks, spoons, and other flat table ware, of varied patterns and general excellence.

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59. Meriden Silver Plate Co., Meriden, Conn., U. S.

PLATED ON BRITANNIA METAL GOODS.

Report.—Specimens of hollow ware with combinations of cut glass, of good quality and general excellence.

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60. Meriden Britannia Co., West Meriden, Conn., U. S.

SILVER-PLATED GOODS.

Report.—Commended for a large variety of silver-plated white metal hollow ware of excellent quality and finish and of tasteful designs; particularly articles made under Prof. Silliman's patented process for hardening. Their silver-plated forks, spoons, and knives are of superior quality and well finished. Their XII. plating or extra plating on exposed parts deserves commendation. Their nickel-plated hollow ware is of very fine finish.

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61. A. Ritter & Co., Esslingen, Germany.

SILVER-PLATED WARE.

Report.—Commended for their collection of electro-plated silver and German-silver ware of fair quality.

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62. Manning, Bowman, & Co., West Meriden, Conn., U. S.

NICKEL-PLATED WARE.

Report.—Nickel-plating for general table ware. They exhibit hollow ware of both soft and hard metal plated with nickel, well adapted for ship, hotel, and family use. The nickel surface is harder than silver plating, of lower cost, and not so liable to tarnish.

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63. Adams & Shaw Co., Providence, R. I., U. S.

SILVER PLATE.

Report.—Very superior silver-soldered silver-plated dining and tea-table ware, of genuine excellence and fine finish.

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64. Reed & Barton, Taunton, Mass., U. S.

SILVER-PLATED WARE.

Report.—Commended for their silver-plated tea and dinner sets, and table ware of superior finish and quality. An ornamental centre-piece, "Progress," deserves commendation. Their knives, forks, and spoons, plated on hard white metal, are of an honest and durable character; the variety of patterns large; their die work well defined, and their designs tasteful.

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65. Nicola Rolaksi, Trebizond, Turkey.

SNUFF-BOX AND BELT OF GOLD.

Report.—Commended for general excellence of workmanship. He exhibits a snuff-box, and a belt of gold, woven very delicately with filigree clasps.

66. **Noury Edin Ousta, Monastir, Turkey.**

INCRUSTATION WORK.

Report.—Commended for excellence of work. He exhibits articles of steel incrusted and damascened with gold. The work is ingenious.

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67. **Francisco Aug. Vaz Cerquinho, Oporto, Portugal.**

SILVER AND GOLD FILIGREE WORK.

Report.—Commended for variety of patterns, particularly in his silver filigree sets, bracelets, and hair ornaments.

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68. **Lobão & Ferreira, Oporto, Portugal.**

SILVER AND GOLD FILIGREE WORK.

Report.—Commended for silver filigree card baskets and cases, jewel caskets, and bouquet holders of tasteful designs and neat execution.

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69. **P. A. Lie, Christiania, Norway.**

SILVER WARE.

Report.—Commended for excellence of workmanship. He exhibits a tankard and drinking-horn in silver and gold of fine and skillful workmanship; also patera and articles of personal wear in silver filigree, Norwegian style.

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70. **J. Tostrup, Christiania, Norway.**

SILVER WORK.

Report.—Commended for excellence of taste, design, and workmanship. He exhibits work of great neatness and precision; also a centre-piece and patera of exquisite workmanship and taste; candlesticks, and a variety of personal ornaments in filigree.

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71. **P. Zuloaga, Madrid, Spain.**

INLAID WORK AND INCRUSTATIONS.

Report.—Commended for skillful workmanship and great beauty of design and finish. He exhibits articles in iron and steel, chiseled and inlaid with gold and silver; a specialty of rich incrustations of metals, portfolios, vases, shields, plateaux, and sword-hilts.

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72. **Gold Working Company, Oporto, Portugal.**

SILVER TEA SERVICES.

Report.—Commended for fine execution of designs, good chasing and engraving.

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73. **Luiz Pinto Moutinho, Lisbon, Portugal.**

SILVER CANDELABRAS AND INKSTANDS.

Report.—Commended for good workmanship generally.

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74. **Emilio Forte, Genoa, Italy.**

SILVER WARE.

Report.—Commended for tasteful workmanship. He exhibits fans, baskets, plateaux, bracelets, and other articles in silver filigree, which are creditable.

75. C. Salvo & Sons, Genoa, Italy.

SILVER WARE.

Report.—Commended for good workmanship at moderate prices. They exhibit silver and gold filigree ornaments.

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76. Elkington & Co., Birmingham, England.

ARTISTIC METAL WORK.

Report.—Commended for their remarkable exhibit of artistic productions and effects with metals combined in incrustations and damascene work, a renewal of the higher qualities of an art of the Middle Ages, with gold and silver decorations upon the darker background of iron and steel; and for repoussé work, the famous Helicon Vase being a noble example of these combinations, and an unmatched and beautiful illustration of human genius and painstaking art work.

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77. Elkington & Co., Birmingham, England.

ENAMELED WORK.

Report.—Commended for their admirable specimens of enameled objects of art, technically known as *cloisonné* and *champ levé* work. They show vases, plates, and other articles in this decorative style, which, for superiority of color and finish, graceful detail of ornamentation, and distinctiveness of outline, place these productions among the really artistic treasures of this Exhibition.

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78. Elkington & Co., Birmingham, England.

ELECTRO-PLATED WARE.

Report.—Commended for rare conceptions and designs in examples of decorative table plate, dinner and dessert services complete, and many other objects for domestic use, in electro-silver and electro-gold and oxidized silver ornamentation, with also electrotype reproductions of masterpieces shown at former Exhibitions. Commended for great mechanical excellence, original and ingenious devices, fine modeling and artistic work in the precious metals, of the most distinguished character.

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79. Valentine Sazikof, St. Petersburg, Russia.

SILVER WARE.

Report.—An exhibition of much novelty and fascination. Commended for chased silver tea ware, tankards, and vases wrought in repoussé, various ornamental pieces, niello work, combinations of brilliant colored enamel and gilt work, and representations of silk and other fabrics in gold and silver designs of genuine artistic character.

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80. John Khlebnikof, Moscow, Russia.

SILVER WARE.

Report.—The silver articles and enameled ware in this collection are interesting specimens of the silversmith's art.

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81. P. Ovtchinnikof, Moscow, Russia.

SILVER WARE.

Report.—Richly chased silver work and decorated silver utensils of novel character and excellence, chiseled and engraved work that is highly meritorious, fine enameling on silver in Byzantine character, and silver-gilt goods in Russian style, a resemblance of damask napkins in white silver with colored enameled borders, resting upon gold and silver baskets; very ingenious conceits. The productions of this exhibitor are worthy of distinguished mention.

82. **Andrew Postnikof, Moscow, Russia.**

SILVER WARE.

Report.—Silver ware, ingenious representation of damask, varied and fine metal work. and metal-mounted albums in old Russian style.

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83. **N. Ivanof, St. Petersburg, Russia.**

SILVER WARE AND GILDED UTENSILS.

Report.—Silver ware, tankards, and gilded utensils, well-modeled groups of marked excellence, with true feeling and expression.

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84. **A. Semenof, Moscow, Russia.**

SILVER WARE.

Report.—He exhibits tea and other utensils of silver with niello work and rich gildings, illustrating patient industry and ingenious labor.

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85. **Henry Steiner, Adelaide, South Australia.**

SILVER PRODUCTS.

Report.—An exhibition of native silver work, vases, and inkstands, ingeniously combined in mounting the eggs of the emu.

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86. **J. M. Wendt, Adelaide, South Australia.**

SILVER WARE.

Report.—Commended for fancifully combining the egg of the emu in ornamental silver work as an inkstand.

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87. **Simons, Opdyke, & Co., Philadelphia, Pa., U. S.**

GOLD AND SILVER WORK.

Report.—Gold mounted walking-canes and batons; also gold, gold-enameled, and silver thimbles. An excellent exhibition of varied designs and superior work.

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88. **Joseph Zasche, Vienna, Austria.**

PORCELAIN AND ENAMEL PAINTING.

Report.—Porcelain and enamel painting and personal ornaments of truly artistic character and superior execution.

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89. **Tiffany & Co., New York, N. Y., U. S.**

SILVER WORK.

Report.—Commended for their display of silver table and tea services and general household silver ware in great completeness. Their exhibit comprises also vases, notably the Bryant vase, yacht prizes, race cups, including that of the American Jockey Club, and many ornamental and presentation pieces, with other varied artistic productions in the precious metals, of distinguished character. They also exhibit a number of jewel-hilted and richly decorated presentation swords, made to order, and of such merit that the judges are at a loss to class them as among the productions of the silver worker or of the jewelers' art. Commended for the genuine excellence of this extensive exhibit, variety of treatment, with novel niello work and inlaid decorations, chased designs, and repoussé execution, originality, taste, and artistic expression.

90. P. L. Krider, Philadelphia, Pa., U. S.

SOLID SILVER TABLE AND HOLLOW WARE.

Report.—Solid silver table and hollow ware of good general character, with engraved ornamentation of excellence.

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91. Gorham Manufacturing Co., Providence, R. I., U. S.

SILVER WARE.

Report.—They exhibit sterling silver dinner services, tea ware, epergnes, race cups, prize and presentation pieces, knives, forks, spoons, and articles for domestic use, almost infinite in variety and purpose; also silver-soldered electro-plated on German-silver hollow ware and flat-rolled table goods. A very complete display of the same general character, and of practical quality and artistic excellence. Commended for great diversity of patterns and originality of designs; for repoussé, chased, and decorative work, with superior mechanical execution and marked excellence of material, both in solid silver and in plated ware. The "Century Vase" in solid silver, the grand central object of their exhibit, is a large and attractive group in sterling silver, illustrating the United States in this centennial year. It is a meritorious and admirable achievement, original in composition, skillful and elaborate in character, and of artistic excellence.

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92. V. Christesen, Copenhagen, Denmark.

SILVER WARE AND REPOUSSÉ.

Report.—Commended for creditable work and tasteful designs. She exhibits solid silver ware repoussé of excellent design and workmanship; also chased work. The centre-piece and tea set of solid silver are meritorious.

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93. Th. Olsen, Bergen, Norway.

A COLLECTION OF SILVER ORNAMENTS.

Report.—Commended for meritorious excellence of workmanship.

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94. National Museum, Cairo, Egypt.

GOLD AND SILVER FILIGREE.

Report.—Commended for tasteful designs and fine workmanship. The National Museum of Cairo exhibits an interesting collection of gold and silver filigree, which is stated to be the work of the negroes of Nubia. They certainly evince a considerable degree of advance in native taste and skill, and deserve encouragement.

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95. Watson & Co., Bombay, India.

GOLD AND SILVER JEWELRY.

Report.—A novel exhibition of native jewelry and ornaments in gold and silver filigree work; also native repoussé work in gold ornaments and in silver utensils, of marked excellence.

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96. Z. Tsuzawa, Kanazawa, Kaga, Japan.

SILVER WARE.

Report.—A chased silver box, an exact reproduction of an artistic French model; ingenious and careful work.

97. **Lee Ching, Canton, China.**

GOLD FILIGREE WORK.

Report.—Commended for attractive gold filigree ornaments, combined with carvings of the beaks of the cassowary, and for ivory work.

98. **Ho-A´-Ching, Canton, China.**

SILVER WARE.

Report.—Commended for his exhibit of chased silver tea ware, tankards, cups, goblets, and vases, illustrating ingenious and patient industry.

99. **Wilhelm Binder, S. Gmünd, Germany**

SILVER WARE.

Report.—Commended for creditable execution of cheap silver goods.

100. **Humbert & Heylandt, Berlin, Germany.**

SILVER WARE.

Report.—Commended for faithful copies in silver (galvanoplastic) of the celebrated treasures of Hildesheim.

101. **Koch & Bergfeld, Bremen, Germany.**

SILVER WARE.

Report.—Commended for excellence of manufacture of silver ware in renaissance.

102. **Soergel & Stollmeyer, S. Gmünd, Germany.**

SILVER THIMBLES.

Report.—Silver thimbles of moderate price and numerous styles.

103. **Gabler Brothers, Schorndorf, Germany.**

SILVER THIMBLES.

Report.—Silver thimbles of moderate price and varied patterns.

104. **Hu Kwang Yung, Hang Chow, China.**

BRONZES.

Report.—Commended for his remarkably conspicuous and interesting collective exhibit of cloisonné enameled vases, and many other utensils, and old bronzes, attractive as rare specimens of both ancient and modern Chinese art.

105. **Ho Kan Chen, Shanghai, China.**

BRONZES.

Report.—Commended for his interesting collective exhibition of Chinese antique art bronzes of varied age, character, and purpose.

106. **Yazayemon Yokoyama, Takaoka, Echiu, Japan.**

BRONZES.

Report.—Commended for a bronze censer with birds and quaint figures; chiseled workmanship of the best character in simple and artistic style.

107. R. Muroya, Takaoka, Echiu, Japan.

BRONZES.

Report.—Commended for bronze censers; also candlesticks composed of representations of birds, fabulous or otherwise, such as the ibis or stork, standing upon a turtle. It is noticeable that these same combinations are also to be found among the antique bronzes of Pompeii.

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108. A. U. Shinoyama, Kiyoto, Japan.

BRONZE ORNAMENTS, INLAID.

Report.—Commended for sweetmeat boxes and small bronze articles of use, inlaid, and with different metals in relief; delicate and tasteful work.

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109. Zenbeye Shirasaki, Takaoka, Echiu, Japan.

BRONZES.

Report.—A bronze censer and candlesticks, very elaborate and exquisite in design, and of distinguished excellence.

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110. Kanaya Gorosaburo, Kiyoto, Japan.

BRONZES.

Report.—Interesting specimens of tinted bronze tea ware, vases, goblets, and boxes of superior excellence.

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111. Yasobye Kawamura, Kiyoto, Japan.

BRONZES.

Report.—Bronze and silver tea and coffee utensils, novel in color from especial alloys, and of good workmanship.

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112. Kawara-bayashi Hidekuni, Kiyoto, Japan.

BRONZES.

Report.—Bronze tea ware, fine in shape and tasteful in decoration.

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113. Yeske Shomi, Kiyoto, Japan.

BRONZES.

Report.—Bronze vases, boxes, and trays, with figures in high relief; dexterous and truly artistic work.

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114. Honma Takusai, Sado Island, Japan.

BRONZES.

Report.—Finely cast bronze statuettes and articles of utility in ingenious and varied colors.

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115. Koji Yamakawa, Kanazawa, Kaga, Japan.

BRONZES.

Report.—Interesting specimens of bronze utensils and vases richly inlaid and highly decorated in varied colors, some of which are graceful in shape.

116. Chinso Hiraoka, Tokio, Japan.

BRONZES.

Report.—Very superior bronze vases chiseled in relief, with gold and silver decorations in varied colors.

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117. Soyemon Momose, Tokio, Japan.

BRONZES.

Report.—A pair of fine bronze vases with well-modeled human figures; excellent work.

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118. Soshichi Kanamori, Takaoka, Echiu, Japan.

BRONZES.

Report.—Dark bronze vases and jardinières richly inlaid with silver; elaborate and painstaking work, of superb character, and admirable in form.

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119. Saito Zenbeye, Tokio, Japan.

BRONZES.

Report.—A remarkable bronze vase of varied colors, with figures in relief, and incrustations of gold and silver, illustrating native story.

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120. Mizuno Genroku, Kanazawa, Kaga, Japan.

BRONZES.

Report.—Bronze vases, caskets, and utensils of ingenious workmanship and pleasing character.

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121. Chiokito Suzuki, Tokio, Japan.

BRONZES.

Report.—Bronze censers and vases of unrivaled character. One large vase especially remarkable, the decorations of which, illustrating the weak the prey of the strong, with the handles composed of groups of birds, half a score or more in number, ingeniously suspended in divers positions, is admirably modeled, and cast in one piece.

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122. Count Stolberg-Wernigerode's Works, Ilsenburg, Germany.

REPRODUCTIONS.

Report.—Excellent iron cast reproductions of ancient repoussé work.

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123. Conrad Felsing, Berlin, Germany.

REPRODUCTIONS.

Report.—Zinc or imitation bronzes of patriotic monuments and persons, at moderate prices.

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124. B. Boschetti, Rome, Italy.

ART BRONZES.

Report.—A collection of Corinthian bronze statuettes, reproduction of the antiques. Commended for manifest artistic excellence and faithful rendering of the spirit of the original.

125. **Nicholas Stange, St. Petersburg, Russia.**

BRONZE WORK.

Report.—Commended for his exhibit of nickel-silvered bronze chandelier, candelabra, and lamps, of elaborate designs in strictly Russian style, with finely chiseled work, of interesting character.

126. **Felix Chopin, St. Petersburg, Russia.**

BRONZES.

Report.—His bronzes, modèled by Lancéré, representing groups of animal life, soldiers, peasants, and the like, are of the highest artistic quality. The designs are native and original, modeled admirably, and full of character and lifelike expression.

127. **Susse Brothers, Paris, France.**

BRONZES.

Report.—Artistic bronzes, cast upon models of well-known artists, excellent in finish; ornamental clocks of good style; small tables in onyx and bronze; lamp-bearers of very fine chasing. Upon the whole, a remarkable collection.

128. **Louis Marchand, Paris, France.**

BRONZES.

Report.—A very fine collection of artistic bronzes, containing especially two important pieces: a chimney-piece of marble and oxidized bronze, of a pure style and remarkable finish, and a round sofa with a jardinière in the centre, in marble and silvered bronze. The design and chasing of the bronze ornaments are remarkable.

129. **Joh. Martin Krug, Hanau, Germany.**

ENAMEL PAINTING AND GOLD JEWELRY.

Report.—Commended for enamel paintings of superior execution, and for lockets, crosses, and pendants of gold.

130. **Sauvage & Rück, Paris, France.**

BRONZES.

Report.—Real bronzes, copies of old Roman designs and of antique vases.

131. **Henry Perrot, Paris, France.**

BRONZES.

Report.—A collection of small artistic bronzes, very remarkable in design and chasing.

132. **Louis Martin, Paris, France.**

BRONZES.

Report.—Artistic castings of good finish.

133. **Ames Manufacturing Co., Chicopee, Mass., U. S.**

BRONZES.

Report.—They exhibit a colossal bronze naval group of three figures in action, with a mortar; modeled by Larkin G. Mead, cast by this company, and destined for the Lincoln

Monument at Springfield, Illinois. Commended for the high character of this important work, true color of the Government standard of bronze metal, and admirable and lifelike embodiment of the artist's conceptions.

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134. Mitchell, Vance, & Co., New York, N. Y., U. S.

BRONZE AND MARBLE CLOCKS, BRONZE, AND ZINC IMITATIONS OF BRONZE.

Report.—Marble mantel clocks with mountings of real bronze, and zinc imitations of bronze, with figures, vases, and statuettes of the same, the marble work and the metal work of which are of general excellence.

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135. Auguste Lintelo, Brussels, Belgium.

BLACK MARBLE CLOCKS.

Report.—Black marble clocks and companion pieces of fine polish, well-engraved ornamentation, and good general style, at moderate cost.

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136. A. H. Rodanet, Paris, France.

DECORATIVE CLOCKS.

Report.—Portable clocks of rich and artistic models of various designs.

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137. Bouchet-Gravet, Paris, France.

ORNAMENTAL CLOCKS.

Report.—Ornamental clocks and light-bearers, in gilded bronze, of very good execution.

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138. A. Morel, Paris, France.

DECORATIVE CLOCKS.

Report.—Commended for good style and finish.

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139. J. B. Gondy & Co., Pontarlier, Doubs, France.

WATCH CASES.

Report.—Watch cases with portraits of historical characters, of very good execution.

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140. Breguet & Co., Paris, France.

WATCHES AND CLOCKS.

Report.—Watches and clocks with enamel ornaments of excellent design and execution.

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141. C. & A. Pequignot, Philadelphia, Pa., U. S.

GOLD WATCH CASES.

Report.—Gold watch cases of superior mechanical execution and artistic ornamentation.

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142. Robbins & Appleton, New York, N. Y., U. S.

GOLD AND SILVER WATCH CASES.

Report.—They exhibit three hundred and fifty gold watch cases, and fifteen hundred silver ditto, of all varieties essential to the trade, the weekly product of their establishment combined with the Waltham Watch Company.

Commended for excellence of mechanical work, quality of engraved and enameled decorations, great variety of patterns and special designs.

143. **Fortenbach & Sons, Carlstadt, N. J., U. S.**

SILVER WATCH CASES.

Report.—An exhibit of silver watch cases of varied styles, made by machinery and die-work; the bizzels without soldering, showing excellent and durable work, with tasteful ornamentation.

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144. **Edward Favre-du-Bois, Locle, Switzerland.**

ENGRAVING OF WATCH CASES.

Report.—Well-executed and faithful portraitures of Washington and Lincoln, with other decorative work.

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145. **Ernest Humbert-Pourtalès, Locle, Switzerland.**

WATCH CASES.

Report.—Watch cases of novel design and superior workmanship

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146. **J. S. Adams & Co., Providence, R. I., U. S.**

TORTOISE-SHELL GOODS—JEWELRY.

Report.—Commended for great variety of tasteful patterns and excellent finish generally.

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147. **William K. Potter, Providence, R. I., U. S.**

TORTOISE-SHELL JEWELRY AND ORNAMENTS.

Report.—Commended for variety and taste in display, with skillful and excellent work.

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148. **Milo Hildreth & Co., Northboro', Mass., U. S.**

TORTOISE-SHELL GOODS.

Report.—Commended for a large variety of patterns and general excellence.

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149. **Mariano Labriola, Naples, Italy.**

TORTOISE-SHELL ORNAMENTS.

Report.—Commended for excellence of workmanship. He exhibits various ornaments in tortoise-shell, highly creditable for their taste and delicate execution.

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150. **Charles Neher, Philadelphia, Pa., U. S.**

HAIR ORNAMENTS.

Report.—Hair ornaments and fancy designs of hair-work, of good taste and creditable excellence.

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151. **C. Cottier & Sons, New York, N. Y., U. S.**

LAPIDARY WORK.

Report.—An exhibition of lapidary work, or imitations of gems, of fine color, well cut and well polished.

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152. **Louis A. Goldschmidt, Dubnik, Hungary, Austria.**

OPALS.

Report.—A collection of fine Hungarian opals, set in the most advantageous and workmanlike manner.

153. Ettore Geraldini, Rome, Italy.

MOSAICS, STONES, AND CAMEOS.

Report.—Commended for good display of pleasing designs, Byzantine mosaics, stones, cameos, gold Etruscan ornaments, and jewelry.

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154. Hoessrich & Woerfel, St. Petersburg, Russia.

ORNAMENTAL STONEWORK, MALACHITE, AND LAPIS-LAZULI.

Report.—Commended for their remarkable collection of objects in malachite, lapis-lazuli, labradorite, rhodonite, jasper, and other Siberian stones, consisting of decorative clocks and vases, small objects of adornment, tables, and lamps. Two very conspicuous pieces, a chimney mantel in malachite, and a large table in the same stone. The whole exhibition of a very high character.

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155. Kraul & Bier, Hanau and Oberstein, Germany.

STONES AND CAMEOS.

Report.—Commended for choice cameos of artistic cutting.

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156. Franz Bergmann, Gablonz, Bohemia, Austria.

IMITATION GEMS.

Report.—Commended for imitation gems closely approaching genuine stones in color and brilliancy.

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157. His Highness the Bey of Tunis, Tunis.

PERSONAL ORNAMENTS.

Report.—Commended for an interesting exhibition of native personal ornaments in silver and gold.

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158. Collective Exhibition of Parisian Manufacturers, represented by M. Lutton, of Paris, France.

ZINC CASTINGS.

Report.—A collective exhibition of artistic castings in zinc (imitation bronze) of exceptional merit.

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159. T. Murakami, Kiyoto, Japan.

LACQUERED WARE, JARS, AND VASES.

Report.—Commended for novelty in black lacquered ware, as jars, vases, and tea-caddies, on a basis of tin, gilded inside, and with bright white decorations of ingenious character upon the black ground.

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160. Shippo Kuwaisha, Nagoya, Owari, Japan.

ENAMELED METAL.

Report.—Commended for garden or temple lanterns. Important specimens of cloisonné work of a very remarkable character, superb in execution, and good in color.

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161. E. G. Zimmermann, Hanau, Germany.

GALVANOPLASTIC IMITATION BRONZES AND ART CASTINGS.

Report.—Commended for artistic metal castings and electro-plated utensils, imitation of bronze, oxidized goods, and statuettes.

SIGNING JUDGES OF GROUP XI.

The numbers annexed to the names of the Judges indicate the reports written by them respectively.

MARTIN P. KENNARD, 37, 38, 39, 40, 41, 42, 45, 50, 52, 53, 57, 58, 63, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 89, 90, 91, 95, 96, 97, 98, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 124, 125, 126, 133, 134, 135, 141, 142, 143, 144, 150, 151, 159, 160.

PETER GOTTESLEBEN, 62, 67, 68, 72, 73, 146, 147.

G. H. HEAP, 1, 32, 33, 34, 35, 36, 54, 65, 66, 69, 70, 71, 74, 75, 92, 93, 94, 149, 153.

ROULLEAUX DUGAGE, 154.

JULIUS DIEFENBACH, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 43, 44, 46, 47, 48, 49, 51, 55, 56, 59, 60, 61, 64, 88, 99, 100, 101, 102, 103, 122, 123, 127, 128, 129, 130, 131, 132, 136, 137, 138, 139, 140, 145, 148, 152, 155, 156, 157, 158, 161.

SUPPLEMENT TO GROUP XI.

REPORTS
OF
JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.
COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

1. Prosper Schryvers, Brussels, Belgium.

A PANEL FOR A DOOR IN FORGED WROUGHT-IRON WORK.

Report.—Commended for the surpassing skill exhibited by the artisan, and tasteful design. This is a grape-vine with its leaves, branches, and fruit fabricated in wrought iron, with the hammer, by an exceedingly skillful workman, displaying so much ability that it might be classed in the art department.

2. John Neal, London, England.

GOLD JEWELRY.

Report.—Commended for the solid, substantial character of the articles exhibited, in the originality and chaste elegance of their designs, in the skillful workmanship exhibited in the mounting and setting of the gems, general fine finish, and ingenuity in fabrication, necklaces being so made that they can be changed into a pair of bracelets and a brooch, and vice versa.

3. Charles Williams, St. Louis, Mo., U. S.

TENNESSEE, ITALIAN, AND MISSOURI MARBLE WORK; JEWEL BOX.

Report.—Well-made examples of fine marble work of tasty designs.

4. Edward Miller & Co., Meriden, Conn., U. S.

BRONZED ORNAMENTS.

Report.—Commended for good designs and execution in cheap imitation, bronzed ornaments.

5. **H. Muhr's Sons, Philadelphia, Pa., U. S.**

GOLD FINGER RINGS, SOLID AND FILLED.

Report.—Commended for the excellence and low prices of the goods and the taste displayed in their design and finish. This is an exhibit of some four hundred varieties of plain gold and other finger rings in amethyst, topaz, garnet, and other stones, cameos and intaglios; very commendable.

6. **J. W. Klintberg & Co., Wisby, Sweden.**

JEWELRY MADE OF PETRIFACTIONS.

Report.—Commended for the novel idea of utilizing a material of little value intrinsically, but of great beauty when properly prepared, and thus producing cheap jewelry of good quality. In this exhibit fossils, such as corals, are ground and polished and mounted in gold, or in some cases in silver gilt.

SIGNING JUDGES OF SUPPLEMENT TO GROUP XI.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

CHARLES STAPLES, JR., 1, 2, 5.
COLEMAN SELLERS, 3, 4, 6.

United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP XII.

EDITED BY
FRANCIS A. WALKER,
CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1877.

Entered, according to Act of Congress, in the year 1876, by the
CENTENNIAL BOARD OF FINANCE,
In the Office of the Librarian of Congress at Washington.

SYSTEM OF AWARDS

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

* * * * * * * * * * *

Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respectively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP XII.

JUDGES.

F. H. PIERPOINT, Fairmount, Marion County, W. Va.

JOHN CUMMINGS, Boston, Mass.

THOMAS MILES, Philadelphia, Pa.

J. PARKE POSTLES, Wilmington, Del.

M. GUIET was temporarily assigned from Group XVII to assist in the examination of leather.

GROUP XII.

LEATHER AND MANUFACTURES OF LEATHER, INCLUDING BOOTS, SHOES, TRUNKS, ETC.

(*For Harness and Saddlery, in part, see Group XVII.*)

Hides and skins, salted or dried.
Leather of all kinds.
Parchment, vellum, etc.
Boots and shoes.
Trunks, and traveling equipments, in part; mail-bags.
Belting, cords, straps, etc.
Harness and saddlery. (See Group XVII.)

CLASS 532.—Machines for preparing and working leather.

CLASS 533.—Machines for making boots and shoes.

GENERAL REPORT

OF THE

JUDGES OF GROUP XII.

INTERNATIONAL EXHIBITION, 1876.

PROF. F. A. WALKER, *Chief of Bureau of Awards:*

SIR,—We furnish herewith the general report of the Judges upon Leather and Leather Manufacture.

Respectfully yours,

JOHN CUMMINGS,
THOMAS MILES,
J. PARKE POSTLES.

GROUP XII.

LEATHER AND MANUFACTURES OF LEATHER.

The Judges of Group XII., after completing their examination, can but express their pleasure at the extensive and varied exhibition, embracing every variety from an infant's shoe to a man's cavalry boot.

GREAT BRITAIN AND COLONIES.

The exhibit of boots and shoes in the English department was small, but of a very superior quality, consisting of hand-stitched men's and women's work, of all the finer styles of boots, gaiters, and high and low shoes. The boot-legs and uppers were very superior; the stitching was elaborate; the work sewed by the American McKay sole-sewing machine was of a very heavy and substantial character; and the workmanship and finish were excellent. They also exhibited a lock-stitch wax-thread sole-sewing machine (we should say an improvement on the McKay, using its horn) displaying considerable skill. It is a very heavy and well-built machine, and the work sewed on it was of a strong, heavy, and durable quality.

CANADA.

An extensive exhibit of men's, women's, misses', and children's boots, gaiters, high and low shoes, hand-stitched, McKay machine-sewed, heavy-pegged work, etc. Some of the hand-stitched work was very fine, of superior finish, and compared favorably with the best work exhibited.

The McKay machine-sewed and heavy-peg work was of a strong, substantial character, full in width, and suitable for home trade, but in finish and workmanship it does not compare with that of some other countries. The only piece of shoe-machinery on exhibition was a peg-break. As it was not put in operation we could not judge of its merits.

VICTORIA.

An exhibit of men's and women's fine hand-stitched boots, gaiters, and shoes, very excellent in material and workmanship. For style, finish, and proportions they compared favorably with any exhibited.

FRANCE.

The exhibit of boots and shoes was quite extensive, principally of the finer grades of work for men. All the styles and patterns of fine hand-stitched and pump work were represented.

Of women's goods there was a very elaborate display of silk, satin, embroidered and painted, with lace and a variety of trimmings, intended for stage and party purposes, etc.; also some kid and plain work. It was a handsome display.

GERMANY.

The exhibit of boots and shoes was very small. From Mayence came a very superior exhibit of hand-stitched men's gaiters, high and low shoes, and McKay (American) machine-sewed shoes, which were of good material and firm, solid work; but the finish was not fine. Some military and hunting boots were exhibited as novelties.

AUSTRIA.

There were only three exhibits of boots and shoes,—a very small representation of that branch of industry. From Vienna was an exhibit of hand-sewed men's and women's toilet slippers, tastefully and neatly trimmed; a fair article.

RUSSIA.

The exhibit of boots and shoes was small, comprising men's hand-sewed riding, hunting, and dress boots and shoes, with fine peg-work; also fishermen's heavy boots, galoches, etc.; also women's satin, silk, and kid gaiters, slippers, etc.; stage and fancy shoes in a variety of styles, displaying taste and excellence of workmanship; with some cheap grades of work. There was a very extensive exhibit of calf-skins fair (unblacked), boot and gaiter fronts, crimped and uncrimped; also horse-hide uncut skins. The calf-skins were of very superior tannage, very fine texture, and beautiful grain. Horse-hide leather was shown very fine, soft, and mellow; also colt-skins, finished and dyed for gloves, which were very fine.

ITALY.

An extensive exhibit of men's and women's boots and shoes, etc. Hand-stitched work in a large variety for men's riding, hunting, and

plain boots, gaiters, high and low shoes, etc. Women's silk, satin, and kid button and lace gaiters of generally good material and workmanship. Also an exhibit of lasts and forms for shoemakers, boot- and shoe-trees, stretchers, etc., the designs and proportions of which were very good.

SPAIN.

A large exhibit, consisting of men's hand-stitched work, in a variety of patterns and styles; women's pump or thin-sole work, of satin, silk, and kid; and gaiters, slippers, etc., with styles to suit the Andalusian ladies, the workmanship and material of which were generally excellent. There was also an extensive exhibit of list and woven uppers and hemp-sole shoes, intended for army and peasant use, at extremely low prices.

The women's riding bridles and saddles from Madrid constituted a very superior exhibition of taste, skill, and substantial workmanship. The Andalusian bridles and saddlery from Malaga were a very superior exhibit of this class of work, with elaborate ornamentation in embroidering, etc., to suit the taste of Andalusia.

PORTUGAL.

An extensive exhibit of men's, women's, and children's boots, shoes, and gaiters, hand-stitched and pump boots, shoes, and gaiters, of a variety of patterns and styles; and satin, silk, and kid button and lace gaiters, got up for party and dress occasions, of very fine material and excellent workmanship. There was, moreover, a large exhibit of wood-sole shoes with patent-leather uppers, very handsomely stitched; also some plain goods with beaded list, and carpet shoes at low prices.

LUXEMBURG.

A small but good exhibit of boots and shoes; men's hand-stitched and screwed, high shoes, army brogans, screwed; and heavy mining shoes, hob-nailed, of prime material and very substantial; also fine hand-made gaiters, etc., for men and women.

NORWAY.

The exhibit of boots and shoes was small, but generally of very excellent quality, including men's and women's hand-sewed boots, gaiters, shoes, etc., of superior workmanship and material, with some peg and cheaper grades of work.

SWEDEN.

The exhibit of boots and shoes was very excellent, consisting principally of hand-stitched men's boots, gaiters, etc.; riding, walking, cork-soled, patent-leather, tongue boots, of superior workmanship and material; also some superior peg-work, and a small exhibit of women's satin, French kid gaiters, etc.

BELGIUM.

The exhibit of boots and shoes was extensive, and embraced some very superior hand-sewed work for men and women; also screw and cheap grades of work.

CHINA.

An illustrated exhibit of the Imperial Government, consisting of the shoes peculiar to the country, deposited by the Imperial Maritime Customs of Shanghai, Amoy, Canton, Chefoe, Minchang, and Chinking. These were instructive and interesting, as illustrating the tastes and customs of the people in this respect in the different parts of the Empire.

BRAZIL.

A very extensive exhibit of shoes; McKay machine-sewed, French screw-machine, and hand-sewed shoes, from the House of Correction, etc., of excellent material, and good, fair, substantial workmanship, with lasts or forms for men's, women's, and children's goods; also a collective exhibit from Rio de Janeiro and different provinces of the Empire, consisting of hides, skins, leather, saddles, etc.; an instructive exhibit, illustrating the different animals of Brazil, and the condition of the leather industry, etc., in the different parts of the Empire.

ARGENTINE REPUBLIC.

The exhibit of boots and shoes was quite extensive, comprising hand-stitched riding boots and gaiters of good workmanship, with excellent taste, style, and material; together with cheaper grades of work, made very substantially; also a large collective exhibit, made by the Government, representing the different provinces of the Republic, consisting of boots, leather, dry-salted and dry-flint hides, goat- and sheep-skins, and skins of different animals of the country.

The exhibit was intended to illustrate the resources of the country in hides and skins for export or home consumption, and the progress of the leather and shoe industry of the country.

CHILI.

A fair exhibit of fine hand-sewed men's enameled leather riding boots, fancy congress gaiters, women's satin gaiters, etc., of excellent workmanship and good material, taste, and style.

VENEZUELA.

A very handsome exhibit of men's, boys', and women's fine hand-sewed and fine copper-nail, bevel-edge boots and gaiters, cloth-embroidered slippers, and women's and misses' gaiters and slippers, of very superior workmanship and material, and excellent taste and style.

UNITED STATES.

A very extensive exhibit of men's, women's, boys', youths', misses', children's, and infants' kid, goat, serge, silk, satin, etc., of finest hand-made and machine-sewed work, in every conceivable design, with heavy kip, grain, and wax upper leather boots, brogans, etc., made pegged, sewed, screwed, and nailed, suitable for the farmer, miner, and laboring classes, with a great variety of lower grades, at very reasonable prices, to supply the masses. The shoe-machinery and wax-sewing machines were deserving of especial mention, as a very extensive exhibit adapted to the manufacture of the shoe. There were dies and press for uppers and soles; wax-thread-sewing machines for fitting leather uppers; the silk- and thread-sewing machines for fine-class work, with elaborate, fancy, and embroidered stitching, not surpassed by any country in the world; the McKay sole-sewing machine, used in most foreign countries, as well as all through the United States, and the Goodyear welt- and turn-sewing machine, also the Cutlan turn-sewing machine and others, with a variety of screw-, nail-, and pegging-machines; the McKay lasting-machine, for placing the upper over last, with tacker to fasten the upper to the insole, after adding outsoles ready for sewing; sole-moulding machine, for moulding the sole to the bottom of the lasts; edge-turner, edge-setter, heeling-machines, heel-burnishers, sand-paper machines, sole-stripping machines, rollers, skiving- and splitting-machines, and revolving and beam sole-die machines, with a variety of other machines we have not space to enumerate. These machines are mostly adapted to both foot- and steam-power; they displayed considerable skill and ingenuity in construction, and the work was done in a very efficient, rapid, and masterly manner. While we are not willing to accord to all the machines the great economy claimed by exhibitors

over hand-labor, we are satisfied that use of many of the machines will save labor and that they will do their work in an efficient and workmanlike manner. There was also an extensive exhibit of shoe-rasps, files, knives, and tools of great variety for the fitter and sole-finisher, very skillfully made; also eyelet-setters, button-fasteners, patterns of zinc and paper for the uppers and soles of shoes, artistically designed and correctly graded; shoe-rivets and machines for setting the same; lasts or forms, boot- and shoe-trees, stretchers, in large variety and designs; boot- and shoe-crimping machines, doing the work very rapidly and efficiently, and a variety of machines and tools for the manufacturer not enumerated.

When we take into consideration the extensive exhibits displayed in the Shoe and Leather Building, where not over ten per cent. of the tanners and manufacturers were represented, we congratulate the Commission on the increase and development of that branch of our industry.

REPORT ON LEATHER, AND MACHINERY USED IN ITS MANUFACTURE.

Nearly every nation in the world was represented in the leather department, and the exhibits were most interesting and instructive. The various kinds and qualities of leather adapted to the wants of peoples separated from each other by climate and race, influenced in their designs and tastes by the most widely-different customs and habits, were nearly all brought under one roof, and could be easily compared.

A notable feature of this exhibition of the leather products of the world was the rare opportunity it afforded to measure the improvement which modern science has effected in the art of tanning, and this improvement was to be remarked in the manufactures of some of the new colonies, as well as in those of the older countries. This exhibition of the leather of the world will stand alone among Exhibitions for its completeness, variety, and excellence, and as a point from which to mark and note the improvements in inventions of the future.

GREAT BRITAIN.

This exhibit of leather was lamentably small. There was but one exhibit of sole leather; and, while this showed a good degree of skill in the preparation of the hide, it also showed an imperfect tannage. Morocco, in fancy colors, for bookbinding, satchels, pocket-books, upholstery, and fancy leather-work, also Russia leather, and sheep-

skins and skivers, in a great variety of colors and finish, evinced the highest skill, especially in the coloring and finishing, and took rank with the best goods of this class in the Exhibition.

NEW SOUTH WALES.

This exhibit, while not as large and varied as those of some of the older nations, was very creditable to so new a country. The sole leather gave evidence that this department of industry was in the hands of men of skill and enterprise. A notable part of the exhibit was leather made from kangaroo-skins, and the patent and enameled leather made from these skins was remarkable for fineness and toughness of grain.

The large production of hides and skins of this country, together with its great supply of tanning materials, promises to make this one of its most important industries.

AUSTRALIA.

A small variety of leather was exhibited. It was very noticeable for high skill and workmanship and in the perfection of the manufacture. It is apparent from this limited exhibit that this country has the means of producing leather of a high standard, and that its people are able to make this industry most valuable.

CANADA.

The exhibit of leather, entirely of hemlock tannage, was not very extensive. It showed skill and good workmanship. It comprised upper, sole, and harness leather.

FRANCE.

A large and varied assortment of leather of all kinds was exhibited. The sole leather, tanned with oak-bark, showed high skill in the preparation of the hide, causing a minimum loss of hide material in the process; it was of superior quality, and indicated the highest integrity in the manufacture. The calf-skins were none of them fully up to the high standard of French skins. The morocco, comprising black and fancy colors, black glacé and fancy-colored kid, fully sustained the high reputation which it has long maintained. It was noticeable for its elasticity, pliability, and toughness, and for the delicacy of shades, depth, bloom, and permanence of color.

The glacé kid is worthy of special mention for its mellowness, toughness, and its exceedingly beautiful and permanent gloss. The skins are usually tanned open, with Sicilian sumac.

GERMANY.

A small amount of sole leather, finished and unfinished, which did not indicate any noticeable degree of skill in its manufacture, was exhibited. The morocco, kid, etc., of black and fancy colors for shoes, colors for bookbinding and fancy leather-work, glacé kid, and white and colored kid-skins for gloves, etc., evinced high skill and integrity and the most careful and intelligent attention to the details and processes of manufacture, especially in the preparatory processes and tanning, and the coloring and finishing of fancy colors for bookbinding and fancy leather-work. The exhibit of kid-skins for gloves was remarkable for fineness of texture, elasticity, etc.

AUSTRIA.

This exhibit was quite extensive in variety of production, and evinced a good degree of skill and workmanship. Many kinds of upper leather were highly creditable to the producers.

The black and fancy-colored moroccos and white kid-skins, for shoes and fancy leather-work, showed high skill in the manufacture. The fancy colors were noticeable for the beauty and delicacy of coloring and excellence of finish which have long made Vienna's fancy leather goods famous. The sole leather, while it was well prepared, was faulty in not being thoroughly tanned.

SWEDEN.

A small amount of various kinds of leather was exhibited. The upper leather was not equal to the standard of modern workmanship, and the sole leather showed only fair skill in the preparation of the hides, and was deficient in tannage.

NORWAY.

Sole, upper, and harness leather, of oak tannage, was exhibited. The sole leather showed good skill and workmanship in its production, while the upper leather, though fairly made, indicated the use of inferior materials in the finish.

ITALY.

A limited variety of leather was exhibited. There was sole leather, notable for its evidence of high skill and workmanship in the manufacture throughout, but most of the exhibit showed that the modern means and improvements had not been used in this industry.

BRAZIL.

This exhibit of leather made from the skins of a great variety of animals was notably lacking in the application of modern skill and workmanship.

ARGENTINE REPUBLIC.

An extensive variety of upper, sole, and harness leather was exhibited, of which but a small part had been manufactured by the later methods now in use in other countries; and it was evident that the leather would be greatly benefited by the introduction of modern skill and workmanship.

The manner in which the leather was exhibited was such as to place it at a further disadvantage.

SPAIN.

This exhibit comprised quite an extensive variety of leather, but, with few exceptions, it did not show any high degree of skill in its production.

PORTUGAL.

A variety of calf, kip, and sole leather was exhibited. A portion of the calf-skins were of very fine quality, while the rest were lacking in modern skill and workmanship. Some of the sole leather was notable for high skill in the preparation of the hide and its manufacture; the rest lacked complete tannage and was deficient in skill in the production.

TURKEY.

A variety of leather of various kinds and styles was shown. The entire exhibit, owing to its exposed condition, had been very much injured in appearance, and consequently was placed at a great disadvantage. The morocco and sheep leather appeared to be thoroughly tanned, and some of the colors, especially the reds, blues, and yellows, were very clean, strong, and beautiful. The leather showed, however, that this country did not use the modern processes and appliances in its manufacture, but still adhered to its old traditions and the processes of former times.

RUSSIA.

This exhibit comprised an extensive variety of all kinds of leather, in a great variety of styles, for which this country has for a long time been noted. The sole leather showed good skill in the preparation of the hide, but it generally was deficient in tannage. The principal

tanning materials used are willow-bark and kermes. The upper leather, made from calf-, kip-, and cow-hides, was shown in various methods of preparation, and generally evinced high skill and workmanship. The carriage leather was also quite superior in its manufacture. The exhibit of light leather consisted of grain-calf for shoes, finished in imitation of morocco, and notable for its solidity and toughness of grain; and of the famous Russia leather in black and fancy colors,—heavy for boots, trunks, portmanteaus, etc., and light for fine fancy-work; and colt-skin glove leather, which was remarkable for fineness of grain, texture, elasticity, and toughness, as well as for beauty and evenness of colors. The whole exhibit was marked by very high skill in its manufacture.

VENEZUELA.

A very limited exhibit, showing only a fair amount of skill. The sole leather was not completely tanned.

UNITED STATES.

This country exhibited all kinds and varieties of leather. The larger part of these exhibits was from the States of New York and Pennsylvania. Maryland, Ohio, and Kentucky were only fairly represented in the sole-leather department. The New England States were not so well represented as the magnitude of this industry would have warranted. Of hemlock sole leather the quality of the production of this country was well represented, and it was plainly to be seen that a high degree of intelligence had been employed in the manufacture of these exhibits.

The improved methods of preparing the hides make it evident that under the modern processes there is much less loss of hide-material, much less time consumed, and much less waste of gelatin and gluten than under the old methods, thereby producing a more compact and durable leather. The exhibits of oak and hemlock sole leather showed that the tanners are no longer following the old practices of the past, but are bringing to their aid the improvements which modern science has demonstrated to be good and useful. Much of the oak-tanned sole leather was notable for high skill and workmanship. The leather from Ohio and Kentucky was of a high order of excellence, thorough tannage being a marked feature in this department.

With the exception of calf-skins the exhibit of upper leather was not so full as was desirable or might have been expected; and, with a few exceptions, this leather did not indicate any high degree of

skill or workmanship, and was not a fair standard of the quality of the product of the country. There was a large exhibit of calf-skins, and several of them showed a thorough knowledge of the art of manufacture, and were fully equal to any on exhibition. The extensive exhibit of harness leather, mostly of oak tannage, was marked by a good degree of skill and excellence, and was very creditable to the manufacturers. It is apparent that, however much difference of opinion may exist as to the comparative merits of oak- or hemlock-tanned sole and upper leather, there can be no doubt that the oak tannage must claim and secure the preference for superior harness leather.

The exhibit of morocco and light leather was not large, but was measurably complete in its representations of the different varieties manufactured in this country. The growth of this branch of the leather industry has been very marked during the last twenty years, both in the amount produced and the skill and excellence of manufacture, which is most apparent in the production of fancy-colored morocco and sheep leather for shoes, bookbinding, satchels, fancy leather-work, etc. This was illustrated by several complete and very beautiful exhibits of this class of goods, of delicate shades and colors, of all the different styles of finish, that rival and compete with even those countries which have long held pre-eminence in these departments of industry. These remarks hold equally true of different varieties of black morocco, kid, etc., of which there were specimens of very superior merit.

The most noticeable point of merit shown in American morocco, etc., is the great care taken in the finishing processes, and the excellence attained in this respect. There is evidently more care bestowed upon the final or finishing processes than upon the earlier processes of preparing and tanning the skins; from which fact American morocco is noticeable for fineness and solidity of grain, depth and fullness of color, and clearness of gloss. It is mostly tanned with American and Sicilian sumac separately, or a mixture of both, and usually by sewing the skin in the shape of a bag and filling it with the tan liquor, which is pressed rapidly through the pores of the skin, thereby effecting the tanning much quicker than when the skins are suspended in the liquor, allowing the tannin, the fibrin, and the gelatin to combine by natural operation or affinity. Machines for sewing these skins are now in almost universal use in this country.

There was exhibited but little machinery adapted to the manufacture of leather, and while the machines on exhibition showed a good degree of skill in construction and intelligence for the purposes re-

quired, they were so deficient as labor-saving machines that they could not be commended for general use.

In the Government Building there was a collection of leather made from animals representing all the orders of the animal kingdom, from the reptile up to man, the notable feature of the exhibit being its variety. No high skill was indicated in the manufacture. The leather from some of the animals was very well made, but other specimens were below the ordinary standard. That made from the skin of the white whale was a novelty that suggests a new resource for the tanner.

REPORT OF EXPERT ON LEATHER TESTS.

No. 149 BROADWAY, NEW YORK, October, 1876.

MESSRS. CUMMINGS, MILES, POSTLES, AND PIEREPOINT, *Judges in Group XII., U. S. Centennial Exhibition:*

I submit the following report of experiments made, under your direction, to determine some of the qualities which affect the value of different kinds of leather when used for the soles of shoes. These experiments were made at the Centennial Exhibition, during this year, on the various samples of sole-leather exhibited there.

SELECTION OF SAMPLES.—The Judges of leather, appointed by the Centennial Commission, selected sixty-six sides, from all those exposed to be experimented on. A sample was cut from each of these sides, from that part which came nearly over the kidneys. These samples were marked with the exhibitor's number and given to me.

RELATIVE DRYNESS OF THE LEATHER.—These sides had all been hanging in the Exhibition buildings since the opening day (May 10, 1876), and therefore had been in a dry room during the two months preceding these experiments. All of the oak, union, hemlock, Russian, and South American leathers were hanging in the Shoe and Leather Building. The others came from the Agricultural Hall or the Main Building.

After being cut, the samples were kept, for some days, in a drawer in a desk in the office. Although it would appear that all had had an opportunity, extending over two months, to become equally dry, it is not certain that they were so. The only reason I can assign, that can practically have had any effect, is, that the floors of the building were kept continually wet by sprinkling, to keep down the dust. It is possible that those sides which hung nearest to the passage-ways were affected more by the moisture arising from the floor than those which hung farther away. The effect of this must, however, have

been neutralized during the two weeks the samples were kept in the table-drawer before being weighed.

General Plan of Experiments.—1st. Each sample of leather was cut from the side with the same die.

2d. The samples were all weighed.

3d. The thickness was measured,

4th. They were all thoroughly dried, at a temperature of 160°.

5th. They were all weighed, as in the dry state.

6th. They were all thoroughly washed and scoured, in cold water.

7th. They were all weighed when thoroughly saturated with water.

8th. They were all compressed by a force of two thousand pounds per square inch.

9th. They were all dried at a temperature of 160°.

10th. They were all weighed in the dry state.

11th. They were experimented on to determine rapidity of absorption of water, as explained hereafter.

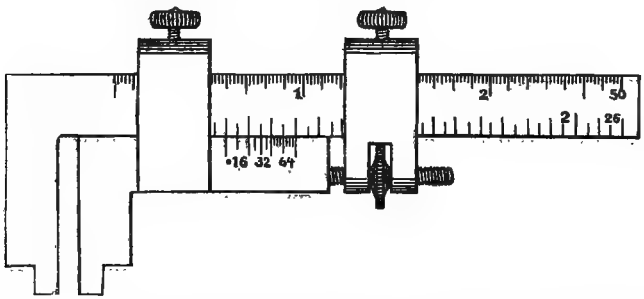
12th. They were placed on grinding-machines and ground for two hours, seven pieces being ground at the same time.

13th. They were dried again at a temperature of 160°.

14th. They were all weighed in the dry state, the difference between this weight and that given at the tenth step being the loss by grinding for two hours.

Size of Samples.—The samples were all cut with the same solid steel die, which was a square, 3½ inches (8.89 centimetres), and therefore had an area of 12¼ superficial inches (7.90 centimetres).

Measurement of Thickness.—This was done with a pair of calipers divided to $\frac{1}{100}$ inch (0.0254 millimetre). Each sample was measured in four places, and the mean of the four taken as the thickness. In the table appended to this report the thickness of each sample is given. The following is the mean of all samples from the same



country, or the same kind of tannage. The figure represents the calipers with which the thicknesses were measured.

TABLE I.

Mean thickness of all samples of leather of the same tannage in the condition in which it was exhibited, both as to dryness and hardness of rolling, and of leather.

	Thickness.	
English	0.290 inches.	7.366 millimetres.
Oak (American)	0.269 "	6.847 "
Australian	0.259 "	6.589 "
Hemlock	0.244 "	6.198 "
Union	0.242 "	6.147 "
Austrian	0.242 "	6.147 "
South American	0.225 "	5.720 "
Italian	0.216 "	5.486 "
Swedish and Norwegian	0.214 "	5.436 "
Russian	0.210 "	5.334 "
French	0.210 "	5.334 "
German	0.208 "	5.283 "

WEIGHT OF SAMPLES.—All the samples were next weighed on a very sensitive balance, having a capacity of 5/8 of a pound (0.366 kilo.), and sensitive to one grain (1.6 centigramme). The pieces were all weighed on the same day, the whole process lasting a little more than an hour. The variation in weight of any piece, from the absorption of evaporation of moisture during this hour, must have been insensibly small. The average results of this weighing are given in Table II.

TABLE II.

Mean weight of samples (3½ inches) = 88.9 centimetres (square) in the condition in which they were exhibited.

English	54.23 grammes.	Union	46.65 grammes.
Oak (American)	51.22 "	German	42.29 "
Hemlock	50.89 "	Swedish and Norwegian	41.37 "
French	49.41 "	Italian	39.10 "
Australian	49.06 "	South American	37.95 "
Austrian	48.24 "	Russian	36.48 "

These are the actual weights and thicknesses in the condition exhibited. How much of the variations are due to the original hide, and how much to the hardness of rolling, or other variations in methods and materials used in tanning, does not appear. In order to compare the actual weights of the leather the following table has been prepared, which gives the weight of a square foot, ¼ inch thick, and is computed for each leather, as shown in detail below for hemlock:

Weight of sample, 3½ inches square		50.89 grammes.
" " 1 square inch, $\frac{50.89}{12.25}$		4.163 "
" " 144 square inches, 4.163 × 144		599.472 "
" " " " $\frac{1}{100}$ inch thick, 599.472		24.57 "
" " " " $\frac{25}{100}$ " " 24.57 × 25		601.4 "
" " 1 square foot, ¼ inch thick = 601.4 grammes = 1.343 pounds.		

It must be remembered that these figures only apply to the leather on exhibition. It seems to be generally acknowledged among leather-dealers that the oak leather on exhibition was heavier (*i.e.*, thicker) than the average offered in the market, while the hemlock and the union were about the average. The inference, then, would be that the hemlock leather in the market is *more* than 12½ per cent. heavier than the oak, for a square foot of equal thickness.

TABLE III.

Calculated mean weight of a square foot of leather of various tannages, if ¼ inch thick.

French	1.52 pounds.	Oak (American)	1.23 pounds.
Hemlock	1.37 "	Australian	1.23 "
German	1.31 "	English	1.20 "
Austrian	1.29 "	Italian	1.17 "
Swedish and Norwegian	1.25 "	Russian	1.12 "
Union	1.23 "	South American	1.09 "

There was only one sample of English leather, while there were several samples of every other kind. A fair comparison cannot be based on one sample, and therefore the English leather must be omitted in considering the foregoing. Omitting the English, it appears that the oak is at the same time the thickest and the heaviest leather on exhibition (Tables I. and II.). The relative weights of the three American leathers are:

Oak	100.0	Hemlock	99.3	Union	90.1

And the relative thicknesses are:

Oak	100.0	Hemlock	90.7	Union	90.1

From these figures it appears that the actual weights of the oak and hemlock leathers are nearly equal, while the hemlock is nearly ten per cent. thinner; and, on the other hand, that the union is about ten per cent. lighter and also ten per cent. thinner than the oak. It would appear that there must be some essential difference in the method of treatment of these leathers, that makes the oak and the union leathers thicker than the hemlock, for the same weight. Whether this difference is due to the pressure used in rolling, to some variation in the treatment during the processes of removing the hair and flesh, trimming, finishing, etc., or to some chemical effect of the oak- or hemlock-bark, does not appear; but as the oak leather, which is made entirely from oak-bark, and the union leather, which is made from ⅞ hemlock and ⅛ oak, are nearly the same, while the hemlock leather is ten per cent. heavier, it would not appear that the variation could be due to the substitution of ⅛ hemlock-bark in place of the oak,

and therefore not to the difference in the chemical effect of the bark.

After having been measured and weighed, as described above, the leather was carefully and thoroughly dried and weighed again, to determine how much water had been dried out. The drying was done by exposing the leather to a current of air, heated by a gas-burner to a temperature of 160° F. (71.1° C.). The temperature was regulated as carefully as possible, and never rose beyond 165° F. (73.3° C.) or fell below 155 F. (68.9° C.). The time required to thoroughly dry the leather was about twenty-four consecutive hours, but the actual time was longer than that, as the leather absorbed during the night, towards the end of the drying process, almost as much as was dried out during the day. The results of the drying are given in Table V.:

TABLE V.

Mean weight of samples of leather of various tannages (3½ inches square), when dried at 160° F. (71.1° C.).

English	49.36 grammes.	Union	42.05 grammes.
Oak (American)	46.74 "	German	37.79 "
Hemlock	46.10 "	Swedish and Norwegian	36.94 "
French	44.38 "	Russian	36.79 "
Austrian	43.93 "	Italian	34.88 "
Australian	42.94 "	South American	34.05 "

From this table the percentage of actual weight lost by drying at 160° may be computed.

TABLE VI.

Mean loss of weight, by drying at 160° F., by leather of various tannages, the original weight of the leather, in the condition it was exhibited, being 100.

Italian	10.7 per cent.	South American	10.2 per cent.
* Australian	12.4 "	Russian	10.0 "
English	10.8 "	Union	9.9 "
* Swedish and Norwegian	10.7 "	Hemlock	9.4 "
* German	10.6 "	* Austrian	8.9 "
* French	10.2 "	Oak (American)	8.8 "

The following table represents the variation in weight of a second set of samples from all the sides of oak, hemlock, and union leather mentioned in this report. The samples were each 2¾ inches (5.27 centimetres) long by 1½ inches (3.81 centimetres) broad, and were cut as nearly as possible from the same place as the original samples. They were weighed every day, being allowed to lie during the interim on a window-sill, where they were exposed to a current of air, but protected from the sun and rain. The weighing was commenced after a season of hot, dry weather, and continued through a season of rainy

* These pieces came from Agricultural Hall or the Main Building.

weather into warm, dry weather again. All of the oak were weighed at once, as were all the hemlock and all the union, so the variations only show the mean for each kind of leather. The thickness of the samples was the same as given in Table I.

It will be seen that the specimens became from $2\frac{1}{10}$ to $2\frac{3}{10}$ per cent. heavier in the rainy than in the clear weather, the hemlock varying the most, as in the case of drying at 160° F., Table VI., and the oak the least. The difference between the variations of the oak and hemlock are in about the same proportion as indicated in Table VI. Thus, hemlock loses by drying at 160° 9.4 and oak 8.8 per cent., the hemlock being more than the oak in the proportion of 107 to 100. The hemlock gains, by exposure to damp air, $2\frac{2}{10}$, while the oak gains $2\frac{1}{10}$ per cent., the hemlock being more than the oak in the proportion of 105 to 100, or nearly the same as before.

TABLE VII.

Showing the variation in weight of eleven pieces of oak, eight pieces of hemlock, and ten pieces of union leather, from the variation in the temperature, or in the hygrometric condition of the atmosphere.

Date.	Weights.						Thermometer. F.	
	Absolute. Grammes.			Relative.			Wet.	Dry.
September.	Oak.	Hemlock.	Union.	Oak.	Hemlock.	Union.	Deg.	Deg.
*6.—A.M.	191.40	134.93	150.47	100.0	100.0	100.0	67	77
†7.—A.M.	191.95	135.40	150.88	100.3	100.3	100.3	67	70
†8.—A.M.	194.88	137.35	153.48	101.8	101.8	102.0	66	67
†8.—P.M.	195.41	137.90	153.95	102.1	102.2	102.3	67½	70
‡9.—A.M.	194.45	137.22	152.95	101.5	101.7	101.7	69	70½
‡11.—A.M.	193.60	136.70	152.40	101.1	101.3	101.3	62	65
‡11.—P.M.	193.85	136.90	152.55	101.3	101.5	101.4	62	65
‡12.—A.M.	193.60	136.55	152.20	101.1	101.2	101.1	63	68
*13.—A.M.	193.75	136.85	152.60	101.2	101.5	101.4	65	69
*14.—A.M.	194.10	137.00	152.75	101.4	101.6	101.6	67	71

After being exposed to the atmosphere till September 14, the pieces were placed in a warm-water bath, and the weight, after they had been exposed to the temperature given in the table so long as not to lose any more weight, determined. The warm-water bath consisted of a tin box, with hollow walls and bottom, which were filled with water. The top had a tin lid, which, during the experiment, was closed and covered with a piece of felt. The water in the walls was heated by a lamp until the thermometer, inserted in it, showed the temperature marked in Table VIII. The bath was 6″ by 4″ by 5″ inside.

* Clear. † Rainy. ‡ Cloudy.

TABLE VIII.

Mean weight of the same pieces of leather as in Table VII., when dried in the water-bath, at various temperatures.

Temperature.	Weights.					
	Absolute.			Relative.		
	Oak.	Union.	Hemlock.	Oak.	Union.	Hemlock.
Atmospheric.	191.40	150.47	134.93	100.0	100.0	100.0
100° F.	180.60	142.20	127.60	94.3	94.6	94.6
120° F.	176.90	138.40	123.80	92.4	92.0	91.8
140° F.	173.90	135.90	122.15	90.8	90.2	90.5
160° F.	171.65	134.50	120.45	89.6	89.4	89.7
Atmospheric.	190.75	149.85	134.55	99.6	99.7	99.8

It will be noticed there is a considerable difference in the weight lost by the various kinds of leather, the Italian losing the most and the American oak the least. There is also considerable variation in the amount lost by different specimens of the same tannage, and every specimen lost some water when warmed to a temperature of 160°.

It has been found by experiment that every kind of wood always contains a certain amount of water, varying, within small limits, with the hygrometric condition of the atmosphere, but which will not permanently decrease, even after many years. This amount of water varies with different kinds of woods. It is stated by various authorities that air-dried wood, stored for some time under sheds, will contain from fourteen to sixteen per cent. of water, as compared with the same dried at 150° F.; and that, on being re-exposed to the atmosphere, it will re-absorb this fourteen to sixteen per cent. of water from the moisture in the air. Certain materials which enter into the composition of leather in larger or smaller quantities, particularly salt and lime, have the property of absorbing a considerably larger proportion of moisture than fourteen to sixteen per cent. It may be that the variations in the proportion of moisture lost by the different samples is due to the varying proportion of these bodies.

All leather will gain or lose in weight from the variations of the amount of moisture contained in the atmosphere. A piece of leather may properly be said to be *dry* when it will not gain or lose any weight from continued exposure to the same atmosphere. If, however, this leather be first weighed after hanging a week or more in a dry loft during the summer season, when the mercury ranges from 90° to 100° F.; and then, again, after a few days' rain, when the mercury has fallen from 60° or 70° F., and all the air is charged with fog or mist (even though no rain or water of any kind shall have

entered the loft), it will be found to have increased in weight from 1½ to 2½ per cent.

If the same leather is laid out in the sun to dry it will, after a few hours, be found to have fallen short of its original weight from six to eight per cent. The limits of variation of weight of leather under practical circumstances are probably as follows:

Weight of leather in dry weather	100.0
" " wet "	101.5–102.5
" " dried in the sun	92 – 94

After being warmed to 160°, the leather was taken out of the bath and allowed to re-absorb, from the atmosphere, as much moisture as it would, in order to see if anything but water had been driven off. It appears that the leather did not become as heavy again, after being heated to 160° F., as before, the loss, however, being only $\frac{4}{10}$ per cent. in the worst case. This loss was probably some very volatile essential oils, which were vaporized at or below that temperature, and were sensible by the very delicate odor that arose from the leather during the first part of the drying. The loss in drying at 160° F., by this experiment, was:

Oak . 9.2 per cent. | Hemlock . 9.5 per cent. | Union . 9.8 per cent.

while the loss from drying, at the same temperature, in the experiment given in Table VI., was:

Oak . 8.8 per cent. | Hemlock . 9.4 per cent. | Union . 9.9 per cent.

The union and the hemlock are almost the same, and the variations in the oak are less than one-half of one per cent.

After the specimens were thoroughly dried, as shown by Table VI. they were all thoroughly washed in water having a temperature of 85°, to learn how much could be washed out. To effect this, they were placed in an iron tank, holding about a barrel of water, the water being continually circulated by a centrifugal pump. The pieces were soaked in this tub for ninety-six hours, during which time the pump was running twenty-eight hours. On being taken out of the tub, they were each carefully examined, to see if any soluble matter remained, which was done by rinsing them in clean water, the soluble matter, if there were any, coming out and soiling the water. When any of the pieces did not appear to be washed clean, they were rubbed until they did appear to be so. It was noticed that the matter washed out of the hemlock leather was a deep red, and that from the oak a yellow-white. Having been washed clean, the samples were allowed to lie in a tub of clean water a few minutes, and then weighed while wet; as in that condition the leather had taken up as much water as

it could hold. This weighing was done by taking the piece from the water and laying it in a wire basket, hung from the scale-beam, and carefully counterbalanced. The sample was not wiped off or dried, and the weight given in the Appendix and in Table IX. includes the little water that adhered to the leather, as well as that contained in the pores. The water adhering to the surface was found to be less than one-half gramme, or about two-thirds of one per cent. In this condition the leather undoubtedly absorbed more water than before the soluble matter was washed out, as the pores originally occupied by the soluble matter were now empty and ready to be filled with water.

TABLE IX.

Mean weight of samples of various tannages, when thoroughly saturated with water, after having been previously dried at 160° F., and all soluble matter washed out in cold water.

English	80.80 grammes.	French	66.18 grammes.
Oak (American)	76.82 "	Russian	63.88 "
Australian	74.66 "	South American	64.64 "
Hemlock	74.44 "	German	61.22 "
Austrian	71.50 "	Swedish and Norwegian	60.69 "
Union	69.84 "	Italian	60.29 "

The relative weight of the samples, before being washed or dried, and when washed and thoroughly soaked, being the proportion of water absorbed, is given in Table X. There is considerable difference in the proportion of water absorbed, the soft and spongy leathers generally taking up the most. The Russian and South American, which took up the most, absorbing from seventy to seventy-five per cent., were soft and pliable, both when wet and when dry, while the French, which took up the least, was hard and stiff, both when dry and when soaked. The oak, which was generally hard when dry, usually became soft when wet, while the hemlock was hard both when wet and dry.

TABLE X.

Mean relative weights of samples, when thoroughly soaked, and when in original condition, the weight in the original condition being 100.

Russian	175.1	English	148.9
South American	170.3	Union	148.0
Austrian	154.8	Swedish and Norwegian	146.7
Italian	154.2	Hemlock	146.3
Australian	152.5	German	144.8
Oak (American)	149.9	French	133.8

After the pieces had been weighed in air they were weighed in water; that is, the wire basket, in which they were placed to be weighed, was suspended from the balance so it came beneath the sur-

face of the water, in a tub below. In this arrangement, whatever portion of the weight of the leather was floated by the water, is relieved from the weight borne by the balance; the weight required in the other scale-pan to counterpoise the leather, thus partly floated by the water, represents the difference between the weight of the leather and the weight of an equal volume of water. The pores and cells in the leather being all filled with water, the difference is really the difference between the actual weight of the fibres and the weight of an equal volume of water. By afterwards taking the leather from the water and drying it, we may learn the actual weight of the fibres. This weight is given in Table XI. The weights of various samples in water are given in the Appendix.

TABLE XI.

Mean weight of samples of various tannages, after all soluble matter is washed out, and the residue dried at 160° F.

Hemlock	43.15	French	39.79
English	42.57	German	35.15
Oak (American)	42.32	Russian	34.28
Australian	39.78	Swedish and Norwegian	34.16
Union	39.10	Italian	32.21
Austrian	38.58	South American	31.26

TABLE XII.

Portion of original weight, when dried at 160°, lost when washed and re-dried at 160° F.

French	14.9 per cent.	Australian	7.4 per cent.
English	14.5 "	Swedish and Norwegian	7.5 "
Austrian	12.2 "	Union	7.0 "
South American	11.1 "	German	6.9 "
Oak (American)	9.4 "	Hemlock	6.4 "
Italian	7.7 "	Russian	6.1 "

It will be seen, in comparing Table V. with Table XI., that there has been a considerable change. The English, which was, before being washed, considerably the heaviest, has lost so much weight in washing as to fall below the hemlock, which was originally third and is now first.

This loss has nothing to do with the effect of drying, for the samples were equally dry in each case. It represents a certain amount of soluble matter which is contained in the leather, and which, in a country subject to continual or occasional rains, must sooner or later be washed out of the soles of shoes or boots worn out-of-doors, even if not washed out by the manufacturer. It represents, in part, the material which stains the stockings when new boots or shoes are worn. In that case it is, probably, sometimes dissolved by the perspiration of the feet. Some of the leathers, particularly the English and the

French, seemed to contain a substance like clay, which was washed out with difficulty. In dry climates, or in the case of boots and shoes worn in the house, this filling might never be washed out, and, remaining in the soles, would certainly increase the resistance to the absorption of water, and might possibly increase the resistance to attrition or wear.

The figures in Table XIII. are the specific gravity, or the relative weights of the fibres of the leather and an equal volume of pure water.

The following is the method of computing, from the weight in water and the weight of the dry fibre, at 160° F.:

EXAMPLE.—OAK, No. 8038:

Weight of sample dried at 160° F., washed and re-dried	40.61
" " in water	13.07
Difference, being the weight of an equal volume of pure water	27.54
Specific gravity, $\frac{40.61}{27.54}$	1.476

This calculation was repeated for every specimen, and the mean taken as the specific gravity of that kind of tannage. It will be seen further on that the specific gravity of the green hide is 1.39; and as the specific gravity of all the specimens of leather is more than this, and as the specific gravity of those pieces which are obviously the best tanned is the highest, I presume that the more tannin is united with the hide the higher will be the specific gravity.

TABLE XIII.

Mean specific gravity of the washed, dried at 160°. Fibre of various tannages.

English	1.5200	Austrian	1.4644
French	1.5145	Russian	1.4587
German	1.4885	Union	1.4564
Swedish and Norwegian	1.4792	Australian	1.4457
Oak (American)	1.4724	Italian	1.4422
Hemlock	1.4668	South American	1.4125

In order to facilitate comparison, Table XIV. has been computed from Tables III., VI., and XII.

TABLE XIV.

Mean weight of that portion of a square foot of leather, originally ¼ inch thick, remaining after all soluble matter is washed out, and the residue dried at 160° F..

	Pounds.		Pounds.
French	1.230	Austrian	1.030
Hemlock	1.143	Oak (American)	1.016
German	1.092	Australian	0.999
Russian	1.055	Italian	0.962
Union	1.043	English	0.949
Swedish and Norwegian	1.032	South American	0.899

After the specimens were all washed, soaked, and weighed, as given in Table X., but before being dried, as given in Table XI., they were all subjected to a uniform pressure of two thousand pounds per square inch, being $12\frac{1}{4} \times 2000 = 24{,}500$ pounds on each piece. This pressure was selected as being about equal to that applied, in practice, in rolling. It was applied to them by placing them under the Riehle testing-machine in the Machinery Hall. The force was applied, in this machine, by a hydraulic press, but the pressure was measured by a scale-beam, as in an ordinary platform scale. The two compressing jaws were of iron, and planed parallel. They were opened 18 inches, and a block of wood 9 inches by 9 inches, and 16 inches long, with ends sawed square, was placed on end on the lower jaw, and an iron plate, turned true, 8 inches in diameter and 2 inches thick, laid on this block. This arrangement allowed the lower jaw to accommodate itself to the leather, which was usually a little thicker on one edge than the other, and to press equally over the whole surface. The samples were then placed successively under this machine, and the hand-pump worked until the scale-beam indicated a pressure of 24,500 pounds (11,113 kilos.), being two thousand pounds per square inch (1406 kilos. on the square millimetre), which took about one-half minute. The machine was then stopped, the pressure relieved, the specimen taken out, and another substituted. During the time the pressure was being applied, the water was forced freely from the samples. When the pressure was relieved the leather did not appear to recover its original thickness, but remained as pressed, being, perhaps, three-fourths as thick as when wet. The samples increased in size from $3\frac{1}{2}$ inches to $3\frac{3}{4}$ inches square, under the combined influence of the pressure and the water, and shrunk, after being dried, to about $3\frac{3}{8}$ inches square, returning, however, when exposed to the natural atmosphere, to their original size of $3\frac{1}{2}$ inches. After being taken from the testing-machine, the samples were dried, at 160° F., with the result already given in Table XI.

The object of this compressing was to be sure all the specimens were equally hard in the experiments which were to follow. It was considered that all specimens had been relaxed, under the influence of the water and rubbing, and that a perfectly equal and a perfectly even pressure on all would bring them into the same state of hardness or compactness.

The next experiment after drying, the results of which are given in Table XI., was to determine the rapidity with which each specimen would take up water. This was done by dipping each specimen, singly, into water, and allowing it to remain ten seconds, taking it

out, wiping it off on a damp cloth, and weighing it carefully. This was repeated twenty-three times for each piece of leather. The whole time each piece was under water was therefore $23 \times 10 = 230$ sec. $= 3$ min. 50 sec. The wiping off and weighing occupied about one minute for each experiment, so the whole time occupied by the whole experiment was about twenty-seven minutes. Generally the samples were nearly saturated during the twenty-three dips, and in some cases were saturated before the twenty-third dip was reached, so that, during the last few dips, the weight did not increase. The mean results of this experiment are given in the Appendix, but the mean results for each kind of leather are given in Table XVI. The unit of weight is the weight of the leather at the time it was dipped, being the weight of the washed sample, dried at 160° F., and including the moisture it had absorbed in the interval elapsing between the time it was weighed, after being dried, and the time it was dipped, which interval varied from six hours to two weeks.

TABLE XVI.

The mean relative weight of samples of leather of various tannages, the weight when washed and dried in open air being 100, after successive immersions in water during an interval of ten seconds, as follows:

Number of Immersion.	Oak	Hemlock.	Union.	English.	Austrian.	Australian.	Italian.	German.	Russian.	Swedish and Norwegian.	French.	Raw Hide.
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	107.2	101.1	103.3	102.1	112.1	104.0	105.0	105.7	103.6	108.6	106.7	102.1
2	111.0	105.0	105.8	104.6	117.2	103.4	108.9	109.0	107.7	113.8	110.6	103.6
3	114.5	107.4	108.5	106.7	120.2	112.3	112.1	111.6	111.2	118.0	113.3	104.6
4	116.2	109.8	110.1	108.9	122.7	115.4	114.8	114.0	114.5	120.9	115.3	105.9
5	118.7	112.0	112.1	111.3	121.2	117.8	117.5	115.7	117.3	123.5	116.9	106.2
6	220.4	113.9	113.9	113.3	126.4	119.8	119.1	116.9	119.1	125.3	118.3	106.2
7	122.2	115.5	115.8	115.1	127.9	121.7	121.9	118.9	120.9	127.0	119.5	106.4
8	123.0	117.1	117.6	116.8	129.2	123.0	123.8	120.1	123.7	128.2	120.6	107.0
9	124.1	118.5	119.3	118.3	130.4	124.7	125.5	121.7	125.4	129.3	121.4	107.6
10	125.3	119.5	122.6	119.7	131.4	125.2	126.9	122.8	127.1	130.3	122.0	108.2
11	126.2	120.7	122.0	121.0	132.3	126.1	128.2	123.9	128.2	131.4	122.6	108.7
12	127.1	121.5	123.3	123.0	133.0	126.8	129.2	124.3	129.7	131 7	123.1	109.3
13	127.6	122.1	124.3	124.6	133.9	127.5	130.3	125.7	130.9	132.2	123.6	109.3
14	128.1	122.8	125.3	126.3	134.4	128.0	130.3	126.4	131.1	132.6	124.1	109.6
15	128.6	123.4	126.2	127.4	134.9	128.4	131.4	127.1	132.9	133.0	124.3	109.6
16	129.1	123.9	127.3	128.8	135.6	128.8	131.9	127.6	133.3	133.4	124.7	110.7
17	129.5	124.1	127.9	130.3	136.2	129.0	132.3	128.4	134.5	133.7	125.0	111.0
18	129.9	124.2	128.7	131.4	136.5	129.2	132.8	128.8	135.4	134.0	125.3	111.0
19	130.2	125.0	129.3	132.9	136.9	129.5	133.0	129.1	136.0	134.3	125.5	111.0
20	130.5	125.0	129.9	134.3	137.3	129.7	133.4	130.3	136.1	134.6	125.7	111.0
21	130.7	125.6	130.7	135.8	137.7	129.9	133.6	130.7	136.9	134.8	125.9	111.0
22	130.8	125.8	130.9	137.3	137.9	130.0	133.7	131.0	137.1	134.9	126.0	111.0
23	130.9	125.9	131.1	138.7	138.2	130.0	134.0	131.2	137.7	134.9	126.1	111.0

The amount of water taken up by the samples during their twenty-three immersions is perhaps as fair a measure as any of the relative absorption of various kinds of leather, when used for the soles

of shoes. It is a measure of the amount of water that will be taken up, in the same time, under the same circumstances, by various kinds of leather. The relative amount, compared with the weight of the sample before being immersed, is given in the last line of Table XVI. The same, compared with the weight of washed and dried leather, is given below:

TABLE XVII.

Mean weight of samples of leather after twenty-three successive immersions of ten seconds each, and relative value of the same compared with the weight of the same when dried at 160° F.

	Absolute.	Relative.
Raw hide	21.70 grammes.	111.0 per cent.
English	59.15 "	138.9 "
Hemlock	63.69 "	147.6 "
Union	57.88 "	148.0 "
Oak (American)	62.67 "	148.1 "
Australian	58.90 "	148.2 "
German	52.06 "	150.4 "
Italian	48.97 "	152.0 "
French	58.15 "	153.9 "
Russian	53.60 "	156.4 "
Swedish	54.87 "	160.1 "
Austrian	64.46 "	167.1 "
South American	58.80 "	188.0 "

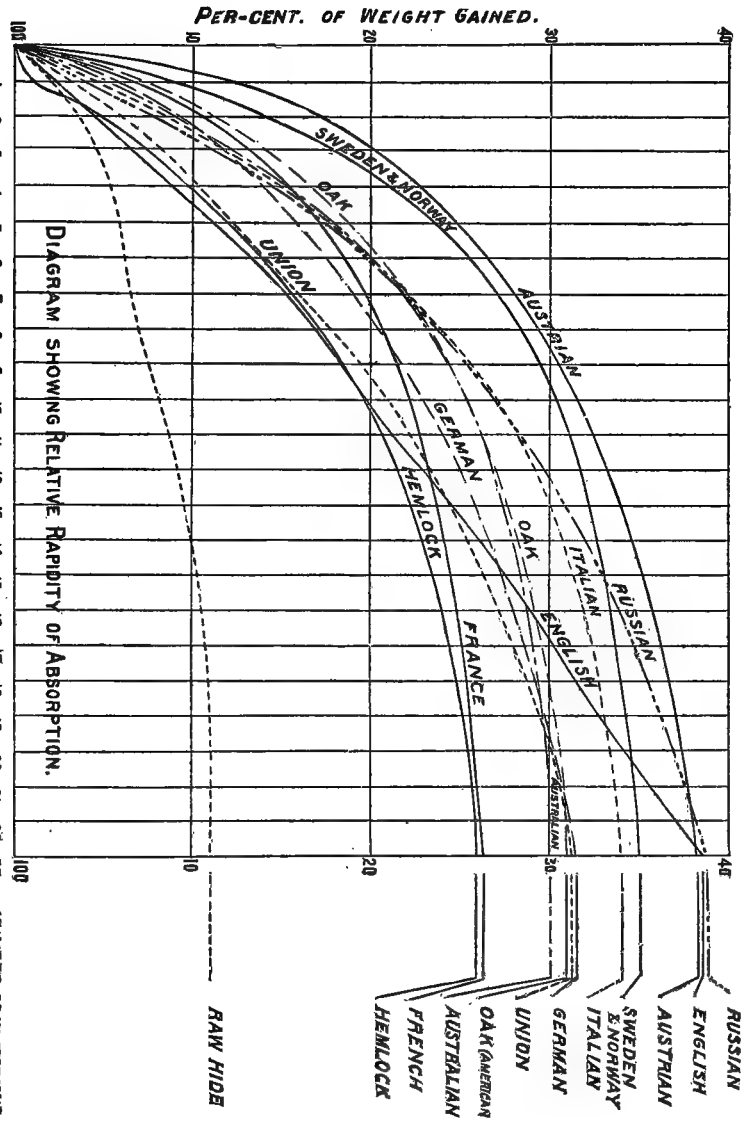
The diagram submitted with this report will show readily, to those familiar with this method of illustration, the rapidity with which various samples take up water. It will be seen that there is a considerable variation among them, the hemlock taking up the least water, and taking that quantity the slowest, while the Austrian takes up the most and the fastest.

There are two classes of curves marked, the first taking up water rapidly at the beginning, but becoming so nearly saturated as to take it up very slowly at the end, and finally retaining more water than the second class, which take up water slowly and uniformly during the whole number of immersions, and are not generally saturated at the end.

To the first class belong the Austrian, Swedish and Norwegian, oak (American), French, Australian.

To the second class belong the hemlock, union, German.

One would expect the leather which weighs the least per square foot, for a given thickness, and in which the fibres are the most dense (*i.e.*, having the greatest specific gravity), would be the most porous, and therefore would take up water the fastest. The Austrian leather is, at the same time, the lightest, and has the highest specific gravity, and that leather does take up water the fastest, and takes the most of


PER-CENT. OF WEIGHT GAINED.
100
10
20
30
40
SWEDEN & NORWAY
OAK
UNION
AUSTRALIAN
GERMAN
HEMLOCK
OAK
ITALIAN
ENGLISH
FRANCE
RUSSIAN
AUSTRALIAN
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
NUMBER OF IMMERSIONS
DIAGRAM SHOWING RELATIVE RAPIDITY OF ABSORPTION.
RUSSIAN
ENGLISH
AUSTRIAN
SWEDEN & NORWAY
ITALIAN
GERMAN
UNION
OAK (AMERICAN)
AUSTRALIAN
FRENCH
HEMLOCK
RAW HIDE

it. Conversely, one would expect the leather which weighs the most per square foot, for a given thickness, and which has the lowest specific gravity, would take up water the slowest and the least. The hemlock leather is, at the same time, the heaviest per square foot, and has the lowest specific gravity, and does take up water the slowest, and takes the least. The experiments on rapidity of absorption, then, are entirely in accordance with a rational expectation.

Arranging the leathers in the order of the weight of the washed and dried square foot:

TABLE XVIII.

Mean weights and specific gravities of a square foot, ¼ inch thick, of various tannages.

	Weight.	Sp. Grav.
French	1.162 pounds.	1.5145
Hemlock	1.143 "	1.4668
German	1.092 "	1.4885
Russian	1.055 "	1.4587
Union	1.043 "	1.4564
Swedish and Norwegian	1.032 "	1.4792
Austrian	1.030 "	1.4644
Oak (American)	1.016 "	1.4724
Australian	0.999 "	1.4457
Italian	0.962 "	1.4422
English	0.949 "	1.5280

A comparison of this table with the diagram or with Table XVI. will show that in every case where one leather is at the same time lighter per square foot, and has a heavier specific gravity, it will absorb water faster, and will absorb more than another. This is true of every leather except the English.

If the two classes be separated we have as follows:

Class I. takes up water rapidly (A., S., O., F., and A.).
Mean specific gravity 1.4925
Weight of a sq. ft. . . . . 1.0 pounds.

Class II. takes up water slowly (H., U., and G.).
Mean specific gravity 1.4712
Weight of a sq. ft. . . . . 1.093 pounds.

These differences are not great, but they are in the direction indicated.

From an inspection of the results of the experiments on individual specimens of leather, it will be seen that there is a greater variation among the hemlock leathers than any other. If this tannage be divided into two classes, as before, we have:

Class I. takes up water rapidly (Nos. 13–20–12).
Mean specific gravity 1.470
Weight of 12¼ sq. ins. ¼ in. thick . . . . 43.69 grammes.

Class II. takes up water slowly (Nos. 21–16–15–30–31).

Mean specific gravity	1.461
Weight of 12¼ sq. ins. ¼ in. thick	44.58 grammes.

The same is true of the union:

	Class I.	Class II.
Numbers	28–30	34–32–36–37
Mean specific gravity . . .	1.473	1.456
Weight 12¼ sq. ins. ¼ in. thick .	39.22 grammes.	39.80 grammes.

The same is also true of the oak:

	Class I.	Class II.
Numbers	0, 1, 2, 5, 6, 7	11, 4, 3
Mean specific gravity . . .	1.480	1.472
Weight 12¼ sq. ins. ¼ in. thick .	40.72 grammes.	38.20 grammes.

It appears, then, that this law holds true among different samples of the same tannage as well as among all the tannages of different countries and among different tannages of the same country. It probably, then, has some other cause than the different kinds of bark used.*

RESISTANCE TO ABRASION OR ATTRITION.—An experiment was made to determine this quality, but with imperfect success. The machine used for that purpose consisted of a fine-grained Ohio sandstone, intended to be used as a grindstone. It was mounted on a vertical axle like a millstone, and revolved at the rate of 75 revolutions a minute. The pieces of leather, after having been washed, dried, etc., as already described, were tacked on wooden blocks by four screw-pegs in each piece. These wooden blocks were portions of an annular ring 30 inches outside diameter and 23 inches inside diameter. The whole number of segments necessary to complete the ring was twenty. Only eight blocks were used, which were spaced equidistant around the circumference of the stone on the upper face. These were kept from revolving with the stone by chocks screwed on the frame-work of the machine. These chocks were so shaped that they did not crowd the wooden block and the leather tacked on it down on the face of the stone, but only prevented it from revolving with the stone. The blocks were laid on the stone with the leather *down*, and an iron weight laid on them. The leather then being pressed down on the

* I presume this arises from the different methods of preparing the hide. If treated with lime the fat is saponified, and may be washed out with water. If the hide is "sweat" a considerable portion of the fat might remain in the hide. This fat would go to fill the pores of the leather and make it heavier per cubic foot, as well as of a lighter specific gravity. I am told that the hemlock leather on exhibition is generally "sweat leather," while the oak is generally "limed." If it should prove to be true that the hemlock leathers which took up water fast were limed, and the reverse, the question would be settled. This would also account for the fact that the "gains" are greater in hemlock leather, while there appears to be more tannin combined in the oak. NOTE.—This has not proved to be true.

stone by the weight and rubbed by the stone revolving beneath, it would in course of time be worn away. The whole weight pressing down upon the leather was 6¼ pounds (2.83 kilos.), being (6¼ ÷ 12½ =) ½ pound per square inch (0.35 kilos. = per c²). The diameter of the stone was 30 inches (0.762 metres), and its velocity nearly 75 revolutions per minute. The speed of the rubbing surface was therefore nearly 500 feet (152.4 metres) per minute, or 5½ miles (8.8 kilos.) per hour. The stone was driven by a 5-inch (12.5 centimetres) belt on a 30-inch (0.762 metres) pulley through a pair of mitre-wheels from a 15-inch (0.381 metres) pulley on the line shaft. This belt often slipped, although very tight.

It was expected that this machine would offer an exact means of determining the relative resistance of the various kinds of leather to attrition or abrasion. The experiment was not perfectly successful for the following reasons:

On the first trials, the surface of the stone soon after being started became glazed by the dust ground off from the leather, working into the pores of the stone and filling them up, until the surface was as smooth as polished glass; in this condition it did not cut away the leather at all. This difficulty was overcome after many trials by allowing a little stream of fine sand to fall on the centre of the stone through an orifice in the bottom of a box, which was scattered uniformly over the surface by the centrifugal force. The quantity of sand used was about four quarts per hour. This removed the difficulty from glazing, but the effect of the sand rubbed on the stone by the leather was to cut away the stone much faster than the leather. As the stone wore down it became softer and cut away the leather much faster than at first, and although the surface was trued up at the end of each experiment (lasting two hours and grinding seven pieces), it would become full of furrows and hollows before another experiment was completed.

The friction of the leather on the stone heated both the stone and the leather from a temperature of 80° at the commencement to a temperature of from 140° to 180° in different experiments at the end, and possibly burned the leather a little. The result of all these variations was to vary the weight of the leather worn away in the proportion of 100 to 400 for different specimens at different times, and to destroy all value of different experiments for comparison among themselves.

It would appear that to make such an experiment perfectly successful, the revolving disk should be a perfectly uniform material through that portion of the depth of surface which would be worn

away (such a uniformity could probably be obtained with a cast-iron plate); and that some means should be provided for keeping the surface cool, either by circulating water through a hollow plate or by allowing a little stream of water to play on the under side of the plate, thus keeping the lower surface wet and cool, and conveying the heat away from the upper side through the plate.

As the machine was manipulated during these experiments, seven pieces of leather were placed on it at the same time, and ground for two hours. During these two hours the seven pieces were changed in position every fifteen minutes, so that at the end of the two hours every piece had occupied every place and had been under every weight.

There would appear to be no reason why the weight ground away, under the circumstances, from each of these seven pieces, should not be in proportion to the resistance to attrition or abrasion.

The table appended to this report shows the date and hour of grinding and the weights lost by each piece. If the various pieces of oak, union, and hemlock leather *ground at the same time* are compared, we have the following, as in Table XIX.

It will be observed that the figures representing relative wear are in the same direction as the specific gravities (which I assume to be an indication of the amount of tannin combined with a unit of hide), the leather having the highest specific gravity (and, therefore, presumptively the greatest amount of tannin in combination) showing the greatest endurance.

The following table shows the hours and date of grinding of each piece, being compiled from the Appendix to show which pieces were ground together:

TABLE XIX.

*Showing which pieces were ground on same day and at same hour.**

Date.	Hours.	Numbers of Samples Ground.
August 9	P.M.	23– 24– 41– 44– 52– 60– 70– 71
" 10	A.M.	0– 1–*13–*20–*27– 32– 34–*38
" 11	P.M.	*6– 16– 21– 37– 54– 64– 35– 60
" 12	.....	5– *8–*11– 14– 17–*18–*30– 40
" 14	A.M.	2– 10– 15– 31– 33– 36– 53– 61
" 14	P.M.	4– 7– 12– 28– 42– 50– 55– 45
" 15	P.M.	3– 22– 51– 57– 58– 65– 72– 73
" 16	A.M.	25– 26– 43– 46– 47– 48– 62– 63
" 16	A.M.	67– 68–*18– 56–*27 *66– 34– 37
" 16	P.M.	*6–*11– *8–*13–*20 *38–*30– ...

By comparing those pieces ground on same day, a fair estimate of the relative endurance may be obtained.

* Those marked * are ground twice.

TABLE XIX. A.

Mean weight lost in grinding in same time by the oak, hemlock, and union leathers.

DATE.	WEIGHT LOST IN GRINDING TWO HOURS.		
	OAK (American).	HEMLOCK.	UNION.
August 10	8.04	7.32	8.25
" 11	6.24	10.63	8.49
" 12	8.65	8.90	7.77
" 14	12.28	12.48	11 21
" 14	9.96	9.22	14.40
" 15	5.49	5.70	6.13
Mean	8.41	9.04	9.30
Relative	100.0	107.5	111.5

That is to say, the mean weights of the leather worn away under the same circumstances, when washed and dried at 160° F., will be:

Oak . . . . 100.0 | Hemlock . . 107.5 | Union . . 111.5

The above figures do not indicate the proportionate amount of leather in the condition exhibited that will be ground away under the same circumstances, for the oak loses more by washing and drying than the union or hemlock. The 100 parts of washed and dried oak leather worn away will be represented by 122.3 parts of leather in its original condition, the 107.5 hemlock by 127.7, the 111.5 union by 134.2. The relative amounts worn away then will be in the original leather in the proportion of 122.3, 127.7, and 134.2, or

Oak . . . . 100.0 | Hemlock . . 104.4 | Union . . 109.7

And the relative endurance,—

Oak (American) . . 100.0 | Hemlock . . 95.7 | Union . . 91.1

In order to make these experiments complete, I have experimented upon some pieces of raw hide.* All the samples were cut from the same portion of the hide as the samples of leather, just over the kidneys. A, B, C, and D were from a green salted hide. E, F, G, and H were from a dry South American hide. J and K were also from a dry South American hide. The first eight pieces were all soaked for a week in a strong solution of slacked lime. At the end of that time the green hide was found to be so much softened that the hair and grain could be easily scraped off. The hair was taken off from all four, and in addition, as much of the grain as could be easily scraped

* In the ordinary experiment of having a pair of shoes made, one with a hemlock sole and one with an oak sole, the fact is usually lost sight of that, as the soles are originally of the *same thickness*, the hemlock sole weighs about 12 per cent. the most.

off from A and B. There was some flesh and fat left on all four. Nos. E, F, G, and H, being dry hide, were not nearly so soft, and the hair and flesh were removed with difficulty. Nos. J and K were first experimented upon with the hair on, only being washed and first scraped off with a knife. In this condition they contained all the grease and oil in the natural hide that were not soluble in water. They were then soaked in a strong solution of slacked lime for forty-eight hours, and at the end of that time were so far softened that the hair and some little flesh remaining could be with difficulty cleaned off. All the hair and flesh were carefully removed. After being limed, these pieces are designated as J′ and K′. The flesh and fat from the green salted hide did not appear to be soluble in water, even after so long a soaking in lime that the hide could be punctured with the fingers.

TABLE XX.

Giving mean results of experiments on raw hide. Samples 3½ inches square (8.89 centimetres).

WEIGHT (GRAMMES).

	Absolute.		Relative.		Specific Gravity.
	Wet.	Dry.	Wet.	Dry.	
*A	51.20	14.95	344	100	1.369
*B	46.40	13.57	341	100	1.368
†C	60.50	19.35	312	100	1.290
*D	45.00	15.25	293	100	1.339
‡E	56.20	20.70	271	100	1.400
F	52.10	19.30	269	100	1.389
G	54.35	19.13	284	100	1.389
H	45.00	16.00	281	100	1.386
J	48.67	24.90	195	100	1.369
K	46.70	24.55	187	100	1.368
J′	46.16	21.62	223	100	1.390
K′	44.50	20.92	213	100	1.390

The following is the result of those experiments:

1st. Thoroughly limed and partially cleaned green salted hide (A and B) has a specific gravity of 1.3685, and will absorb 2½ times its weight of water.

2d. Thoroughly limed green salted hide, thoroughly cleaned on hair side and partially on flesh side, has a specific gravity of 1.3, and will absorb twice its weight of water.

3d. Partially limed and thoroughly cleaned dry South American hide has a specific gravity of 1.388, and will absorb 1¾ times its weight of water (F, G, and H).

* A, B, and D had a little fat on them when dry.

† C had considerable fat, probably at least (19.35—15.25 =) 4.10 grammes more than D.

‡ E was put into a hot solution of lime.

4th. Dry South American hide, with hair on, not limed, and only washed and cleaned with knife, will have a specific gravity of 1.3685, and will absorb nine-tenths of its weight of water (J and K).

5th. Some pieces of dry South American hide will, after being thoroughly limed and cleaned, lose fourteen per cent. of weight, will absorb 2¼ times their weight of water, and will have a specific gravity of 1.390 (J′ and K′).

It will be observed that pieces of dry South American hide, before being limed, after flesh is scraped off, weigh:

J	24.90
K	24.55
Mean	24.72

and that some pieces, after being limed, weigh, when freed of hair, flesh, and fat:

J′	21.62
K′	20.92
Mean	21.27

and that, therefore, the loss of fat and flesh through liming (including weight of hair, which must be insensibly small = 24.72—21.27) is 3.45 in an original weight of 24.72, or a loss of fourteen per cent. of the original weight.

It will be also noticed that the pieces of dry South American, before being limed (J and K), weigh nearly the same when worked after being limed (J′ and K′), from which the inference would be, if the hides were not dried and weighed, that the loss of weight by liming had been insensibly small. This inference would, of course, be incorrect.

All remarks in regard to dry hide apply to hide dried at 160° F.

From these results I conclude that thoroughly cleaned, raw hide may be, without sensible error, assumed to have a specific gravity of 1.390.

Very respectfully,

THERON SKEEL.

APPENDIX.

The following tables contain the whole of the results of measurements and weighings made during the experiments. The lines are numbered consecutively, and the same numbers apply to the same items in each case. The items in each line are given below:

1. Name of tanner.
2. Kind of hide. { s, slaughter. d, dry.
3. Method of removing the hair and of plumping. { s, sweat. l, limed. a, acid.
4. Exhibition number.
5. Stamped number.
6. Thickness of sample in hundredths of an inch.
7. Original weight in grammes.
8. Weight in grammes after drying at 160° F.
9. Weight in grammes when washed and saturated with water.
10. Weight in grammes when in water.
11. Weight in grammes dried at 160° F.
12. Specific gravity.
13. Loss of weight in grinding two hours.
14. Date of grinding. Proportional weight. Original weight 100.
15. When dried at 160° F.
16. When wet.
17. When washed and dried at 160° F. Weight after being immersed in water during the following number of intervals of ten seconds each, viz.:
18. 0 Immersion.
19. 1 Immersion.
20. 2 Immersions.
21. 3 "
22. 4 "
23. 5 "
24. 6 "
25. 7 "
26. 8 "
27. 9 "
28. 10 "
29. 11 "
30. 12 "
31. 13 "
32. 14 "
33. 15 "
34. 16 "
35. 17 "
36. 18 "
37. 19 "
38. 20 "
39. 21 "
40. 22 "
41. 23 "
42. Ratio of original weight of leather to weight of same when washed and saturated with water; original weight being 100.

OAK.

1	A. L. Hench.	C. Trautwein & Co.	Conrad, Fakel, & Mooney.	Henry J. Rife.	A. K. Shriver & Son.	Deford & Co.	Jacob Hoffman.	J. B. Hoyt & Co.	J. P. Wilkinson & Bro.	Keen & Coates.	C. B. Williams & Son	
2	s.	s.	salt.	s.	s.	s.	s.	s.	s.	s.	s.	
3	l.	l.	l.	l.	l.	l.	l.	l.	l.	l.	l.	Means.
4	8038	7792	7801	8071	2274	8019	9696	3647	7933	1461	3977	.....
5	0	1	2	3	4	5	6	7	8	10	11	.....
6	26	26	27	28	27	26	28	30	25	30	.23	26.9
7	49.25	49.33	52.71	52.75	51.55	53.05	56.98	59.44	46.18	51.63	40.56	51.22
8	44 93	45.42	48.00	48.50	47.57	49.02	52.72	54.91	42.39	46.93	36.76	46.74
9	77.90	74.30	76.16	83.20	77.30	70.71	79.20	86.40	71.70	81 20	67.00	76 82
10	13.07	13.27	13.45	13.80	13.62	14.32	15.75	16.30	12.08	13.45	10.86	.....
11	40.61	40 38	42.67	42.80	42.67	43.87	48.47	49.98	37.91	42.27	33.93	42.32
12	1.476	1.489	1.462	1.476	1.469	1.484	1.482	1.485	1.468	1.467	1.471	1.4724
13	7.62	8.46	14.64	10.65	9.77	9.52	6.04 (6.07)	10.15	8.41 (5.45)	9.91	8.03 (4.20)	.....
14	10	10	14.A.M.	15	14.P.M.	12	11 (16)	14.P.M.	12 (16)	14.A.M.	12 (16)	.....
15	91.1	92.1	91.1	91.9	92.2	93.1	92.5	92.4	91.8	90.9	90.5	91.2
16	158.0	150.7	144.5	159.8	149.9	133.4	142.4	145.6	155.2	157.3	165.0	149.9
17	82.5	81.9	80.9	84.8	82.7	82.8	85.0	84.0	82.1	81.9	83.6	81.8
												Totals.
18	42.50	44.70	48.60	49.10	47.95	50.20	56.20	56.10	42.90	47.90	38.25	526.4
19	47.35	49.70	54.05	50.85	49.20	54.25	59.30	63.45	44.45	50.30	39.60	563.5
20	49.50	53.05	55.60	52.35	50.15	55.70	61.75	66.10	47.05	52.25	41.25	584.6
21	51.10	54.95	56.75	53.55	51.10	56.70	63.55	67.50	49.20	53.70	42.45	600.4
22	52.60	56.20	57.60	54.65	52.10	57.50	65.55	68.40	50.60	54.90	43.50	614.6
23	53.60	57.35	58.40	55.55	53.00	58.15	66.50	69.20	51.75	56.05	44.55	624.1
24	54.35	58.35	59.00	56.30	53.80	58.85	67.35	70.20	52.80	56.95	45.70	633.6
25	55.10	59.20	59.50	57.00	54.55	59.40	68.20	70.75	53.85	57.90	46.55	643.7
26	55.65	59.70	59.95	57.60	55.25	59.90	68.85	71.00	54.30	58.40	47.25	647.8
27	56.30	60.35	60.10	58.05	55.80	60.45	69.50	71.45	55.00	59.30	48.05	654.4
28	57.00	60.75	60.40	58.50	56.35	60.85	70.00	72.00	55.40	59.70	48.60	659.6
29	57.70	61.20	60.55	58.90	56.75	61.20	70.25	72.35	55.95	60.40	49.25	664.5
30	58.00	61.50	60.70	59.35	57.00	61 45	70.60	72.75	56.10	60.85	49.85	668.0
31	58.20	61.65	60.95	59.55	57.40	61.75	70.80	73.05	56.50	61.25	50.35	671.4
32	58.40	61.95	61.15	59.90	57.70	62.15	70.81	73.45	56.60	61.60	50.75	674.4
33	58.80	62.10	61.20	60.05	58.00	62.35	70.85	73.70	56.70	62.10	51.25	677.1
34	59.05	62.15	61.15	60.35	58.35	62.50	71.00	74.10	56.80	62.60	51.45	679.5
35	59.25	62.35	61.35	60.45	58.50	62.80	71.00	74.35	56.95	63.00	51.70	681.4
36	59.50	62.45	61.45	60.65	58.85	63.00	71.00	74.60	57.05	63.15	51.90	683.6
37	59.65	62.70	61.65	60.90	58.85	63.15	71.00	74.75	57.05	63 55	52.05	685.3
38	59.85	62.70	61.90	60.90	59.10	63.35	71.00	74.85	57.05	63.80	52.40	686.9
39	60.05	62.90	62.00	61.05	59.30	63.45	71.00	74.85	57.05	64.10	52.40	688.1
40	60.25	63.05	62.00	61.05	59.40	63.50	71.00	75.10	57.15	64.30	52.40	689.1
41	60.20	63.05	62.00	61.20	59.55	63.55	71.00	75.00	57.10	64.45	52.45	689.6
42	158	158	148	141	140	145	146	150	150	154	154	148.1

HEMLOCK.

1	Rockwell & Bros.	Thome, MacFarland, & Co.	J. E. Bulkley & Co.	A. Rumsey & Co.	Adolf Rose.	Hoyt Bros.	Hoyt Bros.	T. E. Proctor.	Bush & Howard.	
2	—	d.	d.	s.	s.	d.	d.	d.	s.	
3	—	s.	s. and a.	l. and s.	l.	s. and a.	s. and a.	s. and a.	l. and a.	Means.
4	8243	8539	8293	7979	7982	7806	7806.61	8290	7983	.....
5	12	13	14	15	16	17	18	20	21	.....
6	29	21	25	25	.22	24	28	25	21	24.4
7	59.89	43.78	49.97	53.21	46.58	48.99	59.90	51.86	43.84	50.89
8	54.52	39.75	44-93	48.31	41.74 (?)	44.45	53.97	46.92	39.90	46.10
9	85.62	65.00	77.20	81.52	67.40	70.70	82.60	74.30	65.65	74.44
10	15.92	11.95	13.56	14.17	12.27	13.22	16.39	14.00	11.90	.....
11	49.92	37.31	43.12	44.77	38.75	42.11	51.17	43.50	37.69	43.15
12	1.469	1.467	1.458	1.460	1.463	1.462	1.477	1.474	1.461	1.4668
13	9.22	7.44 (5.00)	10.27	12.48	10.63	7.31	9.12 (6.05)	7.20 (5.70)	8.68	.....
14	14.P.M.	10 (16)	12	14.A.M.	11	12	12 (16)	15 (16)		
15	91.0	90.8	89.9	90.9	89.9 (?)	90.7	90.1	90.4	91.1	90.6
16	142.8	148.5	154.4	153.2	144.6	144.3	137.9	143.1	150.0	146.3
17	83.3	85.2	86.2	84.1	83.2	85.9	85.6	83.9	86.1	84.2
										Totals
18	57.25	41.85	48.25	50.20	45.50	46.10	59.30	47.10	43.50	456.1
19	60.00	45.75	49.75	51.40	46.50	47.70	62.20	52.35	44.20	460.9
20	62.15	48.00	52.55	53.00	47.85	49.50	63.40	54.35	45.90	478.7
21	63.70	49.50	54.70	54.10	49.30	51.25	64.30	55.80	47.25	489.9
22	64.95	50.65	56.55	55.10	50.40	52.55	65.05	57.15	48.50	500.9
23	66.15	51.55	58.35	56.00	51.50	53.75	65.70	58.45	49.50	511.0
24	67.15	52.50	59.75	56.90	52.45	54.60	66.40	59.50	50.45	589.7
25	68.00	53.40	61.10	57.70	53.25	55.45	67.00	60.65	51 25	527.8
26	68.70	53.75	61.90	58.50	53.95	56.20	67.60	61.65	52.00	534.2
27	69.50	54.35	62.70	59.25	54.50	56.95	68.10	62.20	52.60	540.2
28	70.25	54.70	63.30	59.90	55.15	57.35	68.50	62.60	53.10	544 3
29	70.95	55.00	64.30	60.63	55.50	58.00	69.05	63.00	53.65	550.1
30	71.50	55.30	64.25	61.40	56.25	58.55	69.45	63.30	53.90	553.1
31	71.90	55.70	64.30	62.10	56.30	58.90	69.80	63.55	54.30	556.8
32	72.30	55.80	64.50	62.50	56.80	59.25	70.00	64.00	54.60	559.8
33	72.90	55.90	64.50	63.00	57.10	59.75	70.40	64.25	54.90	562.6
34	73.25	55.85	64.75	63.25	57.40	59.90	70.70	64.55	55.10	565.0
35	73.55	55.90	64.75	63.75	57.65	60.00	71.00	64.70	55.40	566.7
36	73.70	55.90	64.85	64.10	57.90	60.30	71.25	64.90	55.40	568.3
37	73.80	55.90	64.95	64.35	58.10	60.55	71.50	65.05	55.60	570.0
38	74.00	55.90	64.95	64.60	58.30	60.85	71.60	65.05	55.75	571.0
39	74.10	55.90	65.25	64.85	58.45	61.00	72.00	65.25	55.80	572.6
40	74.25	55.90	65.20	65.00	58.65	61.20	72.20	65.35	55.80	573.6
41	74.30	55.90	65.05	65.25	58.75	61.35	72.45	65.35	55.80	574.3
42	149	149	149	145	151	146	141	150	149	147.6

AUSTRALIAN.

1	Forsyth & Sons.	Wright, Davenport, & Co.	Queensland.	Penal Establishment.	Bearley Bros.	John Clark & Son.	
2	—	—	—	—	—	—	
3	—	—	—	—	—	—	Means.
4	—	—	—	—	—	27	.....
5	22	23	24	25	26	25	25.9
6	28	28	20	25	25	51.80	49.06
7	54.25	53.20	35.36	45.37	51.36	45.21	.....
8	47.26	47.19	31.16	42.57	44.36	70.20	74.66
9	77.77	72.22	55.51	69.67	82.42	12.95	.....
10	13.87	113.67	8.78	11.47	13.32	41.09	39.78
11	44.07	43.65	29.68	38.90	41.31	1.444	14.457
12	1.459	1.452	1.425	1.418	1.476	8.76	.....
13	9.82	8.40	7.80	5.80	4.58	(5.70)	
14	15	9	9	16	16	10 16. P.M.	
15	87.2	88.7	88.0	87.7	86.3	87.3	87.6
16	143.1	135	157.3	143.8	160.3	136.1	152.5
17	81.3	82.1	83.8	80.4	80.2	79.3	80
							Totals
18	50.70	50.85	32.20	44.30	47.15	46.60	242.7
19	52.35	52.95	33.20	45.90	50.50	47.90	232.2
20	54.25	55.75	34.35	47.35	53.00	50.20	241.9
21	56.00	57.65	35.45	48.95	54.90	52.40	250.4
22	57.20	58.90	36.60	50.35	56.30	54.25	257.2
23	58.15	60.05	37.75	51.50	57.40	55.20	262.7
24	59.00	60.70	38.90	52.50	58.30	56.35	267.5
25	59.65	61.55	39.95	53.30	59.00	57.45	271.9
26	60.55	61.55	40.95	54.05	59.35	58.00	275.1
27	61.00	62.15	41.95	54.80	59.75	58.50	278.4
28	61.50	62.20	42.75	55.15	60.05	58.65	280.2
29	61.95	62.32	43.50	55.55	60.50	59.00	282.3
30	62.25	62.42	44.15	55.95	60.75	59.20	284.0
31	62.60	62.65	44.75	56.30	60.85	59.45	285.6
32	62.95	62.90	45.00	56.60	60.95	59.55	287.1
33	63.20	63.00	45.45	56.75	61.00	59.55	288.0
34	63.55	63.10	45.75	56.95	61.00	59.65	289.0
35	63.80	63.15	46.15	57.00	61.00	59.75	289.7
36	63.90	63.35	46.30	57.15	61.00	59.85	290.4
37	64.10	63.55	46.30	57.35	61.00	60.00	291
38	64.20	63.60	46.30	57 45	61.00	60.15	291.7
39	64.40	63.65	46.30	57.50	61.00	60.15	292.0
40	64.50	63.75	46.30	57.55	61.00	60.15	292.3
41	64.70	63.65	46.30	57.60	61.00	60.15	292.4
42	147	144	156	148	148	147	148.3

UNION.

1	Daniel P. Ray.	W.H. Osterhout.	Wilcox Tannage Company.	Palmer & Decker.	David Decker.	James Davis & Co.	McKinstry & Childs.	Kinley Bros.	Studwell, Sanger, & Co.	
2	s.	d.	d.	s.	s.	s.	s.	s.	s.	
3	l.	s.	s.	l.	l.	l.	l.	l.	l.	Means.
4	7991	7874	7875	7872	7871	7989	7877	7873	8034	.....
5	28	30	31	32	33	34	35	36	37	.....
6	24	27	25	24	27	23	24	23	21	24.2
7	47.79	50.91	48.62	46.30	53.03	44.50	46.11	41.15	41.43	46.65
8	42.20	45.80	44.27	41.77	48.10	40.20	41.39	37.36	37.38	42.05
9	66.85	77.00	71.27	68.15	80.54	71.06	67.87	63 35	62.50	69.84
10	13.49	13.68	12.68	11.96	13.58	11.55	11.89	10.79	10.72	.....
11	41.05	42.27	41.57	39.41	44.36	37.10	38.34	34.16	33.67	39.10
12	1.489	1.478	1.438	1.435	1.431	1.453	1.449	1.469	1.466	1.4564
13	14.40	7.77 (5.00)	12.68	8.70	13.67	7.80 (4.80)	10.22	7.20	8.49 (5.62)	.....
14	14.P.M.	12 (16.P.M.)	14.P.M.	10	14.A.M.	10 (16.P.M.)	.....	14.A.M.	11 (16.P.M)	
15	88.3	90.0	91.1	90.2	90.2	90.4	89.9	90.9	90.3	90.1
16	139.8	151.3	146.5	147.2	151.9	159.6	147.2	153.9	153.4	143.0
17	85.9	83.0	85.1	85.1	83.7	82.5	83.2	84.9	81.3	82.1
										Totals.
18	46.00	47.35	46.30	44.30	49.85	40.65	45.00	39.75	37.45	396.7
19	48.60	49.40	47.10	45.50	51.30	41.05	48.10	41.00	38.00	410.1
20	49.95	50.85	47.90	46.25	52.95	41.55	49.40	42.05	38.75	419.7
21	51.05	52.00	48.80	47.35	54.35	42.15	50.50	43.00	39.50	427.7
22	51.80	53.00	49.65	48.55	55.50	42.80	51.30	43.75	40.40	436.8
23	52.80	53.75	50.65	49.60	56.55	43.40	52.10	44.55	41.20	444.6
24	53.55	54.50	51.90	50.50	57.55	44.05	52.75	45.30	42.00	452.1
25	54.25	55.20	53.10	51.45	58.35	44.65	53.25	46.00	43.25	459.6
26	55.00	55.90	54.50	52.15	59.20	45.15	54.08	46.60	44.00	466.6
27	55.55	56.30	55.80	52.95	60.10	45.75	54.20	47.15	44.75	472.6
28	56.15	56.75	56.85	53.60	60.80	46.40	54.70	47.75	45.40	478.4
29	56.60	57.45	57.60	54.40	61.50	47.00	55.30	48.25	46.00	484.1
30	57.05	57.95	58.45	55.00	62.15	47.55	55.70	48.75	46.50	489.1
31	57.50	58.25	59.00	55.45	62.60	48.10	56.00	49.20	47.00	493.1
32	57.95	58.70	59.35	55.90	63.05	48.75	56.20	49.65	47.50	497.1
33	58.30	58.90	59.90	56.40	63.45	49.35	56.50	50.05	48.00	500.0
34	58.50	59.20	60.35	56.90	63.70	49.80	56.90	50.45	48.45	504.3
35	58.90	59.65	60.60	57.35	63.90	50.30	57.20	50.90	48.85	507.7
36	59.10	60.15	60.85	57.65	64.25	50.85	57.30	51.35	49.25	510.8
37	59.30	60.45	61.00	58.00	64.50	51.40	57.40	51.60	49.60	513.3
38	59.55	60.55	61.25	58.15	64.65	52.00	57.70	51.85	49.95	515.7
39	59.55	61.05	61.35	58.35	64.80	52.50	57.80	51.95	50.30	517.7
40	59.50	61.25	61.35	58.60	65.10	52.95	57.95	52.15	50.55	519.4
41	59.50	61.35	61.45	58.65	65.30	53.50	58.05	52.25	50.70	520.9
42	145	145	148	140	149	144	152	153	150	148.0

NOTE.—Numbers 7874 and 7875 are "hemlock" tannage which were erroneously classed among the "union."

* Tanned in 90 days.

AUSTRIA.

1	E. Tauesch, k. v.	D. Kreitner & Sons, k. iii.	E. Tauesch, k. viii.	E. Tauesch, k. vii.	F. Kreitner & Sons, k. i.	S. S. Hoffman, k.	D. Kreitner & Sons.	E. Tauesch, k. vi.	
2	—	—	—	—	—	—	—	—	
3	—	—	—	—	—	—	—	—	
4	—	—	—	—	—	—	—	—	Means
5	40	41	42	43	44	45	46	47	.....
6	27	25	16	17	23	26	35	25	.....
7	52.39	49.20	26.86	30.50	46.35	54 29	75.59	50.52	.....
8	46.66	43.97	24.46	28.40	41.97	49.40	62.95	44.59	.....
9	77.90	73.20	47.85	52.77	70.30	77.46	99.87	72.71	.....
10	13.91	13.18	6.84	6.97	12.17	14.42	19.98	13.23	.....
11	41.87	41.00	22.45	23.52	39.04	42.35	59 76	38.66	.....
12	1.493	1.474	1.438	1.421	1.451	1.516	1.502	1.520	.....
13	7.82	6.55	25.40	3.87	5.34	25.13	9.31	7.27	.....
14	12	9	14.P.M	16	9	14.P.M.	16	16	.....
15	89.0	89.4	90.9	93.1	90.5	90.9	83.3	88.3	.....
16	.....	.....	.....	.....	.....	.....	.....	.....	.....
17	79.7	83.3	83.4	77.1	84.1	85.6	79.0	76.5	.....
									Totals.
18	48.75	48.30	25.60	27.50	45.20	47.90	66.35	43.05	325.7
19	52.00	50.65	27.45	28.50	47.60	49.30	68.70	45.15	365.4
20	53.75	52.50	29.40	29.35	49.80	50.40	70.45	46.45	382.1
21	54.95	53.80	31.15	30.15	51.30	51.20	71.75	47.35	391.7
22	56.00	54.95	32.40	31.00	52.30	57.90	72.95	48.10	399.7
23	56.90	55.95	33.60	31.65	53.05	52.50	73.80	48.80	406.3
24	57.75	56.70	34.55	32.25	53.55	53.05	74.50	49.40	411.8
25	58.55	57.35	35.30	32.85	53.95	53.55	75.00	50.00	416.6
26	59.25	58.10	35.85	33.45	54.30	54.00	75.40	50.50	420.9
27	60.00	58.80	36.45	33.85	54.60	54.40	75.75	50.80	429.7
28	60.70	59.20	36.80	34.35	54.85	54.85	76.10	51.20	428.1
29	61.20	59.75	37.00	34.85	55.00	55.05	76.40	51.60	430.9
30	61.55	60.30	37.30	35.10	55.15	55.55	76.55	51.80	433.3
31	62.00	60.65	37.60	35.85	55.30	56.90	76.80	52.05	435.8
32	62.35	61.10	37.70	35.80	55.45	56.20	77.05	52.30	437.9
33	62.75	61.45	37.85	36.20	55.60	56.35	77.05	52.70	439.7
34	62.90	61.95	38.05	36.40	55.75	56.60	77.15	52.90	441.7
35	63.25	62.00	38.35	36.90	55.85	56.90	77.30	53.05	443.6
36	63.55	62.10	38.45	37.10	55.90	57.05	77.40	53.25	444.8
37	63.80	62.45	38.55	37.20	56.00	57.20	77.50	53.45	446.2
38	64.00	62.55	38.60	37.55	56.15	57.20	77.60	53.60	447.3
39	64.20	62.70	38.70	37.75	56.25	57.25	77.60	53.85	448.4
40	64.35	62.80	38.80	37.95	56.25	57.30	77.80	54.10	449.4
41	64.50	63.00	38.80	38.15	56.35	57.35	77.75	54.30	450.2
42	.....	.....	.....	.....	.....	.....	.....	.....	.....

ITALY.

1	Baldini, Agostini, & Co.	Antonio Yarralli.	Nicolas Baluffi & Son.	Antonio Yarralli, ii.	Cassino Morello.	
2	—	—	—	—	—	
3	—	—	—	—	—	
4	—	—	—	—	—	
5	48	50	51	52	53	Means.
6	31	19	19	20	19	21.6
7	56.90	31.45	37.60	31.73	36 81	39.10
8	49.62	28.35	34.29	29.33	32.87	34.88
9	86.48	52.51	55.25	53.05	57.42	60.29
10	15.55	7.76	9.20	7.51	9.95	.....
11	45.51	27.33	29.11	27.70	31.50	32.21
12	1.519	1.398	1.462	1.872	1.460	1.4422
13	5.20	27.84	9.36	7.80	10.11	.....
14	16	14.P.M.	15	9	14.A.M.	.....
15	57.4	90.0	91.7	89.7	89.6	89.3
16	152	169	147	169	156	155
17	80.0	86.5	77.1	84.4	82.9	82.4
						Totals.
18	51.20	31.40	32.90	32.00	35.10	182.6
19	52.00	32.30	35.90	35.15	36.35	190.8
20	52.85	33.55	37.90	36.90	38.00	199.0
21	53.60	35.10	38.45	38.25	39.35	204.8
22	54.35	36.45	39.15	39.45	40.45	209.9
23	55.15	37.55	39.85	40.50	41.55	218.7
24	55.80	38.80	40.50	41.50	42.40	219.0
25	56.40	39.70	41.05	42.45	43.25	222.8
26	57.05	40.45	41.40	43.25	44.05	226.2
27	57.60	41.30	41.80	43.85	44.75	229.3
28	58.15	42.00	42.05	44.35	45.20	231.8
29	58.65	42.55	42.55	44.60	45.81	234.2
30	59.05	43.20	42.70	44.75	46.45	236.2
31	59.55	43.50	42.95	44.85	46.65	237.9
32	59.85	43.80	43.05	45.10	47.15	239.0
33	60.30	44.15	43.25	45.00	47.45	240.2
34	60.55	44.10	43.50	45.00	47.75	241.0
35	60.70	44.30	43.60	45.00	48.20	241.8
36	61.00	44.10	43.85	45.00	48.45	242.6
37	61.25	44.10	43.95	45.00	48.60	243.1
38	61.65	44.10	44.00	45.00	48.80	243.8
39	61.75	44.10	44.15	45.00	48.95	244.1
40	61.95	44.10	44.20	45.00	49.05	244.5
41	62.05	44.10	44.30	45.00	49.25	244.9
42	.....	.....	.....	.....	.....	.....

	GERMANY.					SOUTH AMERICA.		
1	Max Keller.	F. A. Kauman.	F. A. Kauman.	F. A. Kauman.		(Estados Unidos de Venezuela.)		
5	54	55	56	57	.....	70	71	.....
4	—	—	—	—	Means.			Means.
3	—	—	—	—				
2	—	—	—	—				
6	18	24	20	21	20.8	20	25	22.5
7	36.30	48.43	39.67	44.66	42.29	32.17	43.73	37.95
8	31.76	42.89	37.68	38.83	37.79	29.07	39.03	34.05
9	55.55	67.80	57.52	64.02	61.22	56.30	72.99	64.64
10	9.85	13.22	11.08	12.43	.....	7.69	10.55	.....
11	29.97	40.55	32.87	37.22	35.15	26.15	36.37	31.26
12	1.490	1.490	1.509	1.470	1.4885	1.416	1.409	1.4125
13	7.14	8.63	7.02	9.91	.....	8.70	6.72	.....
14	11	14. P.M.	15	15	.....	9	9	.....
15	87.5	88.6	94.8	86.9	89.4	90.3	89.5	89.8
16	153	137	145	143	145	175	167	170
17	82.9	83.7	82.8	83.2	83.1	81.3	83.0	82.2
					Totals.			
18	34.75	47.70	38.25	42.55	162.3	30 15	42.05	.....
19	36.90	49.35	40.75	45.65	172.7	40.70	43.60	.....
20	38.40	50.30	42.00	47.40	178.1	43.70	45.20	.....
21	39.40	51.20	42.80	48.95	182.4	44.50	46.85	.....
22	40.40	51.95	43.60	50.20	186.4	45.10	48.55	.....
23	41.00	52.80	44.20	51.05	189.1	45.70	49.95	.....
24	41.50	53.35	44.80	53.00	191.9	45.65	51.25	.....
25	42.05	53.95	45.31	53.70	194.3	45.70	52.45	.....
26	42.60	54.34	45.65	54.35	196.3	45.75	53.40	.....
27	43.15	54.95	46.10	54.95	198.6	45.75	54.60	.....
28	43.55	55.45	46.60	55.55	200.6	45.75	55.50	.....
29	43.90	56.00	47.00	55.85	202.5	45.90	56.40	.....
30	44.35	56.50	47.25	56.20	204.0	45.80	57.15	.....
31	44.80	57.25	47.65	56.30	205.6	45.85	57.80	.....
32	44.85	57.65	47.95	56.50	206.5	46.00	58.35	.....
33	45.25	58.50	48.25	56.65	207.7	46.00	58.95	.....
34	45.50	58.65	48.45	56.75	208.6	46.05	59.45	.....
35	45.85	58.80	48.70	56.80	209.65	46.15	59.80	.....
36	45.95	59.10	48.85	56.80	210.35	46.15	60.10	.....
37	46.10	59.20	49.10	56.85	211.10	46.25	60.50	.....
38	46.40	59.35	49.30	57.00	211.75	46.25	60.80	.....
39	46.70	59.50	49.45	56.90	212.50	46.20	61.05	.....
40	46.85	59.70	49.55	56.90	212.80	46.25	61.20	.....
41	47.10	.....	49.65	56.90	213.35	46.25	61.35	.....
42	.....	.....	.....	.....	.....	.....	.....	

SWEDEN AND NORWAY.

1	Johansen & Co., k. ii.	Johansen & Co., k. i.	Flekkefiord.	Fossens Tannery.	S. B. Mayev.	Klem, Hansen, & Co.	Dalens Interessens Kat.	
2	1 —	1 —	1 —	1 —	1 —	1 —	1 —	
3	1 —	1 —	1 —	1 —	1 —	1 —	1 —	
4	1 —	1 —	1 —	1 —	1 —	1 —	1 —	
	62	63	64	65	66	67	68	Means.
6	21	21	23	22	24	20	19	21.4
7	37.74	38.73	46.11	42.33	46.87	41.48	36.20	41.37
8	33.70	34.73	41.09	37.89	41.58	37.42	32.16	36.94
9	61.85	60.00	69.40	62.70	69.65	58.16	53.10	60.69
10	9.78	9.70	12.69	11.03	12.85	11.28	10.02	.....
11	30.60	31.36	39.00	35.17	38.62	34.06	30.28	34.16
12	1.468	1.447	1.486	1.457	1.499	1.495	1.493	1.4792
13	3.82	4.41	7.63	12.07	7.20	6.81	5.06	.....
14	16	16	11	15	16	16	16	.....
15	89.4	89.8	89.1	89.5	88.6	90.0	88.8	89.3
16	164	155	151	148	149	141	147	147
17	80.9	81.0	84.6	83.1	82.3	82.1	83.3	82.6
								Totals.
18	34.90	36.95	45.40	41.20	45.55	38.85	34.30	277.2
19	35.85	41.40	50.95	43.35	46.80	43.30	37.95	299.6
20	38.60	43.90	53.45	45.60	48.50	45.95	40.25	316.6
21	40.00	45.70	54.80	47.00	49.75	47.75	42.35	327.4
22	41.30	47.10	55.75	48.15	50.80	49.00	43.40	335.4
23	42.25	48.10	56.65	49.15	51.65	50.00	44.30	341.1
24	43.25	48.80	57.20	50.15	52.50	50.55	44.95	347.4
25	44.10	49.45	57.65	51.00	53.15	50.90	45.50	352.3
26	44.75	49.90	58.15	51.81	53.90	51.15	45.85	355.6
27	45.55	50.25	58.25	52.30	54.50	51.25	46.25	358.3
28	46.20	50.50	58.65	53.00	55.10	51.35	46.45	361.3
29	46.75	50.65	58.95	53.20	55.60	51.45	46.70	363.3
30	47.30	50.70	59.05	53.60	56.20	51.55	46.80	365.3
31	47.50	50.75	59.15	53.80	56.80	51.65	46.80	366.5
32	47.90	50.85	59.30	53.95	57.15	51.75	46.95	367.7
33	48.15	50.85	59.35	54.05	57.50	51.80	47.05	368.8
34	48.50	50.95	59.40	54.20	57.90	51.80	47.10	369.9
35	48.70	50.90	59.60	54.35	58.15	51.90	47.15	370.8
36	48.90	50.95	59.70	54.45	58.50	51.95	47.30	371.8
37	49.05	51.00	59.70	54.55	58.55	51.95	47.35	372.2
38	49.25	51.00	59.75	54.60	59.10	51.95	47.40	373.2
39	49.50	51.00	59.85	54.60	59.30	51.95	47.40	373.6
40	49.60	51.00	59.90	54.60	59.30	52.00	47.40	374.2
41	49.80	51.00	60.00	54.60	59.30	51.95	47.45	374.2
42	.....	.....	.....	.....	.....	.....	.....	.....

	FRANCE.			RUSSIA.			
1	Emile Frigo.	E. Sergen Lefebore.		Wladimirsky.	T. Behne.	Broder Ostrom.	
2	—	—		—	—	—	
3	—	—		—	—	—	
4	—	—	Means	—	—	—	Means.
5	72	73	.....	58	60	61	.....
6	23	19	21.0	25	18	20	21.0
7	54.50	44.32	49.41	47.84	31.34	43.48	40.88
8	49.00	39.75	44.38	42.53	28.08	38.85	36.49
9	72.27	61.08	66.18	73.95	53.20	64.50	63.88
10	14.65	12.40	.....	12.55	8.18	11.64	.....
11	42.99	36.90	39.79	40.02	26.22	36.60	34.28
12	1.523	1.506	1.5145	1.456	1.454	1.466	1.4587
13	9.18	8.75	.....	7.32	7.39	11.53	.....
14	15	15.	.....	15.	9	14	.....
15	90.0	89.7	89.9	88.9	89.7	89.3	89.2
16	132	138	134	155	171	148	155.
17	78.3	83.3	80.8	83.7	83.8	84.1	89.3
			Totals.				Totals.
18	49.75	42.35	92.1	46.20	29.75	40.85	116.8
19	52.85	45.40	98.3	49.00	30.35	41.65	121.0
20	54.80	47.10	101.9	51.40	31.20	43.25	125.8
21	56.30	48.05	104.4	53.40	31.85	44.80	130.3
22	57.30	48.90	106.2	55.05	32.65	46.10	133.8
23	58.10	49.55	107.7	56.45	33.35	47.25	137.1
24	58.80	50.20	109.0	57.65	34.00	48.15	139.9
25	59.40	50.70	110.1	58.55	34.65	49.05	142.3
26	60.05	51.05	111.1	59.35	35.35	49.80	145.5
27	60.50	51.35	111.9	59.90	35.90	50.65	146.5
28	60.75	51.60	112.4	60.50	36.60	51.15	148.3
29	61.05	51.85	102.9	60.85	37.40	51.65	149.9
30	61.35	52.05	113.4	61.25	38.05	52.20	151.5
31	61.60	52.25	113.9	61.40	38.70	52.75	152.9
32	61.90	52.45	114.4	61.60	39.25	53.10	153.9
33	61.95	52.55	114.5	61.75	39.95	53.60	155.3
34	62.05	52.80	114.9	61.85	40.45	53.75	156.1
35	62.20	52.95	115.2	61.90	41.00	54.10	157.1
36	62.20	53.15	115.5	62.00	41.50	54.60	158.1
37	62.30	53.25	115.6	62.15	41.95	54.75	158.9
38	62.40	53.35	115.8	62.10	42.45	54.84	159.4
39	62.45	53.55	116.0	62.15	42.80	54.90	159.9
40	62.50	53.65	116.2	62.15	43.05	55.00	160.2
41	62.60	53.70	116.3	62.20	43.35	55.25	160.8
42	.....	.....	.....	.....	.....	.....	.....

REPORTS ON AWARDS.

GROUP XII.

1. J. & I. K. Greenawalt, Harrisburg, Pa., U. S.

OAK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

2. Keen & Coates, Philadelphia, Pa., U. S.

OAK SLAUGHTER SOLE LEATHER.

Report.—Commended for very high skill and superior workmanship, and for integrity in manufacture.

3. J. B. Hoyt & Co., New York, N. Y., U. S.

OAK-TANNED BACKS SOLE LEATHER.

Report.—Commended for skilled workmanship in the preparation of the hide and manufacture of the leather; notable for the perfection of the finish.

4. Conrad Fabel & Mooney, Louisville, Ky., U. S.

OAK SOLE LEATHER.

Report.—Commended for high skill and integrity in the preparation of the hide and the manufacture of the leather; notable for the cleanness and perfection of the flesh.

5. D. Frantz & Son, Louisville, Ky., U. S.

OAK SOLE LEATHER.

Report.—Commended for high skill and workmanship in the preparation of the hide and manufacture of the leather; notable for the cleanness and perfection of the flesh.

6. Wedekind, Hallenberg, & Brother, Louisville, Ky., U. S.

OAK SOLE LEATHER.

Report.—Commended for high skill and workmanship in the preparation of the hide and the manufacture of the leather; notable for the cleanness and perfection of the flesh.

7. F. H. Burt & Son, Mannington, W. Va., U. S.

OAK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

8. **Louis C. Bardes, Cincinnati, Ohio, U. S.**

OAK-TANNED HARNESS LEATHER.

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather; notable for cleanness of flesh and fineness of grain.

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9. **Henry Freiberg, Cincinnati, Ohio, U. S.**

OAK-TANNED HARNESS LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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10. **Martin & Riedle, Cincinnati, Ohio, U. S.**

OAK-TANNED HARNESS SKIRTING AND HOG-SKIN.

Report.—Commended for good skill and workmanship in the manufacture.

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11. **Leas & McVitty, Philadelphia, Pa., U. S.**

OAK SOLE LEATHER.

Report.—Leather made from Texas hides. Commended for skill and thorough workmanship in the preparation of the hide and the manufacture of the leather.

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12. **A. K. Shriver & Son, Union Mills, Md., U. S.**

OAK SOLE LEATHER FROM TEXAS HIDES.

Report.—Commended for high skill and workmanship and thoroughness in manufacture, and noticeable for fine finish and close trim.

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13. **Henry J. Rife, Philadelphia, Pa., U. S.**

OAK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather.

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14. **C. A. Rippman, Newport, Perry County, Pa., U. S.**

OAK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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15. **Henry Kessler, Cincinnati, Ohio, U. S.**

OAK SOLE LEATHER, SLAUGHTER HIDES.

Report.—Commended for good skill and workmanship in the preparation of the hide and manufacture of the leather.

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16. **Elsas & Pritz, Cincinnati, Ohio, U. S.**

OAK SOLE LEATHER, SLAUGHTER HIDES.

Report.—Commended for good skill and workmanship in the preparation of the hide and manufacture of the leather.

17. **Arthur B. Baer & Co., Baltimore, Md., U. S.**

OAK SOLE LEATHER.

Report.—Leather made from slaughtered hides; hides well prepared; notable for being well filled in tanning.

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18. **C. Trautwein & Co., Louisville, Ky., U. S.**

OAK SOLE LEATHER.

Report.—Commended for high skill and workmanship in the preparation of the hide and manufacture of the leather; notable for cleanness and perfection of the flesh.

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19. **E. & D. Nepper, Cincinnati, Ohio, U. S.**

OAK SOLE LEATHER, SLAUGHTER HIDES.

Report.—Commended for good skill and workmanship in the preparation of the hide and manufacture of the leather.

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20. **A. & J. Groetzinger, Allegheny City, Pa., U. S.**

OAK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather, and for cleanness of flesh.

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21. **Jenkins, Staylor, & Co., Baltimore, Md., U. S.**

HEAVY OAK SOLE LEATHER.

Report.—Commended for general good workmanship in the manufacture of the leather.

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22. **Sharp, Tudor, & Co., Baltimore, Md., U. S.**

BUFF LEATHER, OAK-TANNED.

Report.—Commended for high skill in the production throughout.

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23. **Genseman, Miller, & Co., Pine Grove, Pa., U. S.**

OAK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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24. **A. D. Faust & Son, Mount Union, Pa., U. S.**

OAK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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25. **James L. Sommerville, Bellefonte, Pa., U. S.**

OAK SOLE LEATHER.

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather.

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26. **J. A. Bechtel & Son, Newport, Pa., U. S.**

OAK SOLE LEATHER.

Report.—Notable for the skilled workmanship in the preparation of the hide, and for the thorough manner in which the leather is tanned.

27. **James Calling, Pittsburg, Pa., U. S.**

OAK HARNESS LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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28. **J. C. Lappe, Pittsburg, Pa., U. S.**

OAK HARNESS LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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29. **Alex. Holstein, Pittsburg, Pa., U. S.**

OAK HARNESS LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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30. **Charles B. Williams Sons, Philadelphia, Pa., U. S.**

OAK SOLE LEATHER FROM SLAUGHTER HIDES.

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather.

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31. **George Appold & Son, Baltimore, Md., U. S.**

OAK-TANNED SOLE LEATHER; OAK-TANNED CALF-SKINS.

Report.—Leather tanned with chestnut-oak bark; hides well prepared, manifesting skillful workmanship in the tanning; calf-skins well tanned, soft, mellow, and of fair finish.

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32. **J. P. Wilkinson & Brother, Unionville, Pa., U. S.**

OAK SOLE AND ROUGH LEATHER FOR HARNESS.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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33. **Prichett, Baugh, & Co., Philadelphia, Pa., U. S.**

OAK SOLE LEATHER FROM SPANISH HIDES.

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather.

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34. **Michael Eckert, Cincinnati, Ohio, U. S.**

OAK SOLE LEATHER, SLAUGHTER HIDES.

Report.—Commended for good skill and workmanship in the preparation of the hide and manufacture of the leather.

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35. **Lappe & Hax, Pittsburg, Pa., U. S.**

OAK HARNESS LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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36. **Spanogle & Pannebaker, Philadelphia, Pa., U. S.**

OAK SOLE LEATHER FROM TEXAS HIDES.

Report.—Commended for general skill and workmanship in the preparation of the hides and manufacture of the leather. Notable for solidity and cleanness of flesh.

37. **Lang & Wanner, Cincinnati, Ohio, U. S.**

OAK SOLE LEATHER.

Report.—Commended for high skill, integrity, and thorough workmanship in the preparation of the hide and the manufacture of the leather.

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38. **Ohio Falls Oak Leather Co., Louisville, Ky., U. S.**

OAK-TANNED HARNESS AND SHOE SKIRTING LEATHER.

Report.—Commended for high skill and excellence in the manufacture.

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39. **Kiefer, Stifel, & Co., Allegheny, Pa., U. S.**

OAK HARNESS LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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40. **Amos Hollinger, Lancaster, Pa., U. S.**

OAK HARNESS LEATHER.

Report.—Commended for high skill and superior workmanship in the manufacture throughout.

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41. **Jewett & Keating, Buffalo, N. Y., U. S.**

HEMLOCK SOLE LEATHER (TEXAS HIDES).

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather.

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42. **Perry & Collins, Whitneys, N. Y., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for marked skill and workmanship in the preparation of the hide and the manufacture of the leather. Leather made in the Lisle tannery.

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43. **Lapham, Costello, & Co., New York, N. Y., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather. Leather made in the Camden and Clarendon tanneries.

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44. **Bush & Howard, Buffalo, N. Y., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Sole leather made from Texas hides. Commended for skill in the preparation of the hide and for thorough workmanship in the manufacture of the leather.

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45. **A. Corbin & Co., New Milford, Pa., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for excellence and integrity in the preparation of the hide and the manufacture of the leather.

46. **Hoyt Brothers, New York, N. Y., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for skilled workmanship in the preparation of the hide and manufacture of the leather. Notable for being well fleshed and of good color. The products of the Humboldt, Woodland, and Delaware tanneries.

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47. **J. W. & A. P. Howard & Co., Corry, Pa., U. S.**

HEMLOCK SOLE LEATHER FROM TEXAS HIDES.

Report.—Commended for excellence in skill and workmanship in the preparation of the hide and manufacture of the leather. Notable for clear and uniform color.

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48. **Edward Spalding, Boston, Mass., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather. Notable for uniformity of color. Tanned at St. Regis tannery.

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49. **J. F. Schoellkopf & Son, Buffalo, N. Y., U. S.**

HEMLOCK SOLE LEATHER (TEXAS HIDE).

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather.

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50. **Lapham, Smibert, & Co., Chicago, Ill., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather. Notable for good color.

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51. **Thomas E. Proctor, Boston, Mass., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for workmanship in the preparation of the hide and the manufacture of the leather, and for good color.

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52. **Barnes & Merritt, New York, N. Y., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather. Notable for the uniformity of color. Leather tanned in the Oswego tanneries.

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53. **Thorne, McFarlane, & Co., New York, N. Y., U. S.**

HEMLOCK SOLE LEATHER FROM THORNDALE TANNERY.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather.

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54. **Robertson & Hoople, New York, N. Y., U. S.**

HEMLOCK SOLE LEATHER.

Report.—Commended for excellence in the skill and workmanship in the preparation of the hide and manufacture of the leather.

55. Beach & Dodge, Harrisville, N. Y., U. S.

HEMLOCK SOLE LEATHER.

Report.—Commended for high skill and workmanship throughout in the manufacture of the leather.

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56. A. Rumsey & Co., Buffalo, N. Y., U. S.

HEMLOCK SOLE LEATHER.

Report.—Sole leather made from Texas hides. Commended for skill in the preparation of the hide, and for thorough workmanship in the manufacture of the leather.

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57 Grant & Horton, Ridgeway, Pa., U. S.

HEMLOCK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather.

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58. J. E. Bulkley & Son, New York, N. Y., U. S.

HEMLOCK SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather. Leather made in Canadensis, Unionvale, and Aldenville tanneries.

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59. C. H. & G. L. Williams, Buffalo, N. Y., U. S.

HEMLOCK SOLE LEATHER.

Report.—Sole leather made from Texas hides. Commended for skill in the preparation of the hide, and for thorough workmanship in the manufacture of the leather.

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60. Koshland & Brothers, Portland, Oregon, U. S.

HEMLOCK AND OAK TANNED HARNESS LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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61. Mosser & Keck, Allentown, Pa., U. S.

UNION CROP LEATHER.

Report.—Commended for high skill and superior workmanship in the preparation of the hide and manufacture of the leather.

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62. Schultz, Southwick, & Co., New York, N. Y., U. S.

UNION CROP SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather. Leather made in the Union, Keystone, Scotia, Nicholson, and Caledonia tanneries.

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63. Daniel P. Ray, Tyrone, Pa., U. S.

UNION CROP LEATHER.

Report.—Commended for high skill and workmanship in the entire manufacture of the leather.

64. **John Bare, Mount Union, Pa., U. S.**

UNION CROP LEATHER.

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather.

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65. **W. H. Rosensteel & Son, Johnstown, Pa., U. S.**

UNION CROP LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather. Notable for clean flesh and good color.

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66. **James Davis & Co., Pittston, Luzerne County, Pa., U. S.**

UNION CROP SOLE LEATHER.

Report.—Commended for high skill and workmanship in the preparation of the hide and the manufacture of the leather.

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67. **Keese & Thorne, New York, N. Y., U. S.**

UNION CROP LEATHER FROM WELLSBURY TANNERY.

Report.—Commended for skill and workmanship in the preparation of the hide and the manufacture of the leather. Notable for being well fleshed.

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68. **A. & D. McKinstry, Gardiner, N. Y., U. S.**

UNION CROP SOLE LEATHER.

Report.—Commended for good skill and workmanship in the preparation of the hide and the manufacture of the leather.

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69. **T. P. Howell & Co., Newark, N. J., U. S.**

PATENT LEATHER IN VARIETY.

Report.—The patent leather consists of split skirting, winker, bow and trimmings, and collar leather. Commended for high skill and workmanship in its production. The collar leather is notable for strength and toughness of finish; also leather for upholstering in variety, shows notable excellence in its manufacture.

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70. **S. Halsey & Son, Newark, N. J., U. S.**

PATENT AND ENAMELED LEATHER FOR CARRIAGES, HARNESS, AND SHOES; OIL-TOP LEATHER.

Report.—The carriage leather, comprising enameled landau trimming, buggy top, calache, long grain boot and belt leather, is all of excellent workmanship; also collar railing, shoe-tipping, soft dash, smooth dash, grain dash, skerling, and cap-front, all notable for skill in production.

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71. **Henry G. Ely & Co., New York, N. Y., U. S.**

PEBBLED, GLAZED, AND SPLIT LEATHER.

Report.—Commended as showing high skill and workmanship in the manufacture. Notable for uniformity of grain and softness of texture.

72. **J. S. Rockwell & Co., New York, N. Y., U. S.**

SHEEP LEATHER IN A VARIETY OF COLORS AND FINISHES.

Report.—As an exhibit consisting entirely of sheep leather, we consider it unexcelled in extent, variety, and perfection of styles of finish and of shades and colors. We would specially mention for the accuracy and perfection of finish, their lined and diced goods, for hats, pocket books, satchels, and the imitations of goat, seal, hog, and alligator.

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73. **Chas. Knees, Baltimore, Md., U. S.**

SAMPLES OF CORDOVAN LEATHER.

Report.—Commended for excellence of manufacture, being very fine, supple, and tough, and of excellent, clear, permanent black.

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74. **Chatfield, Underwood, & Co., New York, N. Y., U. S.**

BELT LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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75. **F. Osborne, Jr., & Co., Boston, Mass., U. S.**

WAX KIP LEATHER.

Report.—Commended for skill and excellence in the manufacture, and notable for fineness of texture.

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76. **J. Weil & Brothers, Chicago, Ill., U. S.**

WAX LEATHER AND CALF-SKINS.

Report.—Commended for general good skill in the preparation and manufacture.

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77. **C. Ludy & Sons, Philadelphia, Pa., U. S.**

OAK-TANNED CALF-SKINS.

Report.—A very excellent exhibit of oak-tanned calf-skins. Well tanned and finished mellow, soft and pliable stock; but little flank.

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78. **Fred. Woelfel, Allegheny City, Pa., U. S.**

HARNESS LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and in the manufacture of the leather. Notable for fineness of grain and mellowness of the leather.

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79. **David Moffat & Co., New York, N. Y., U. S.**

HARNESS AND RUSSET LEATHER IN VARIETY.

Report.—This leather is the product of different tanneries made under the direction of the exhibitor, and is notable for high skill in selection of the leather and superior workmanship in its finish.

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80. **Page Belting Co., Concord, N. H., U. S.**

BELT AND LACE LEATHER.

Report.—Commended for skill and workmanship in the manufacture of the leather, so as not to weaken the tensive properties of the hide.

81. Henry L. Fairbrother & Co., Pawtucket, R. I., U. S.

BELT LEATHER (GAMBIER TANNED) AND LACE LEATHER.

Report.—Commended for good skill and workmanship in the preparation of the hide and manufacture of the leather.

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82. Frederick Braun, Philadelphia, Pa., U. S.

KIP AND CALF SKINS (OAK-TANNED).

Report.—Commended for skill and workmanship in the manufacture throughout.

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83. Philip C. Zipp, Baltimore, Md., U. S.

WAX CALF (OAK-TANNED) AND BOARDED GRAIN KIP-SKINS.

Report.—Commended for general good workmanship.

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84. Walker, Oakley, & Co., Chicago, Ill., U. S.

CALF AND WAXED UPPER LEATHER.

Report.—Evidencing high skill and superior workmanship in the tanning and finishing; calf-skins notable for plumpness of shoulder and flank, and closeness of trim.

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85. Butler, Dunn, & Co., Boston, Mass., U. S.

BUFF LEATHER.

Report.—Commended for skill and workmanship in the manufacture.

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86. W. W. & J. E. Mooney, Columbus, Ind., U. S.

SOLE HARNESS AND WHOLE HIDE ROUGH LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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87. B. F. Thompson & Co., Boston, Mass., U. S.

BUFF, PEBBLED GRAIN, GLAZED AND SPLIT LEATHER.

Report.—All these varieties exhibit skill and good workmanship in the production.

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88. W. Schollenberger & Sons, Philadelphia, Pa., U. S.

CALF-KID, RUSSIA LEATHER, AND SHEEP SKINS.

Report.—Commended for the skillful and superior manufacture. The calf-kid is notable for suppleness, toughness, closeness of fibre, and excellence of color; roans, linings, etc., for clearness, evenness, and beauty of colors; the Russian leather for fine tough grain, beauty of color and finish, and permanence of the odor peculiar to that leather.

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89. J. & I. K. Greenawalt, Harrisburg, Pa., U. S.

CALF AND KIP SKINS.

Report.—Calf-skins very soft and mellow, well prepared, very loose in flanks and shoulder; kip-skins well prepared and skillfully handled.

90. Adams & Keen, Philadelphia, Pa., U. S.

CURAÇOA BRUSH KID.

Report.—Commended for the thorough and skillful manner in which the different processes of manufacture have been performed, producing stock unexcelled for fineness of grain and texture combined with softness, pliability, and toughness.

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91. Wentz & Clark, Philadelphia, Pa., U. S.

CAPE, OIL BOOT, BRUSH GRAINS, PEBBLES, AND FRENCH MOROCCO; TAMPICO, GLAZED, AND DULL PEBBLES AND BRUSH GRAINS.

Report.—The exhibit shows the most careful, intelligent, and skillful workmanship in all the processes of manufacture; all the details of manufacturing have been faithfully carried out, and the result is mellow, pliable, tough leather of superior excellence. The black is very good, and the gloss clear and permanent.

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92. Pusey, Scott, & Co., Wilmington, Del., U. S.

SOUTH AMERICAN AND PATNA FRENCH MOROCCO, PEBBLES, STRAIGHT GRAINS, AND IMITATION OF FRENCH KID.

Report.—Commended for general excellence of manufacture, the stock being tanned open and by a new process. Owing partly to the peculiar tannage and to skillful workmanship in finishing, the product is firm yet mellow leather, of very fine grain, with full, plump flanks and edges. The black is strong and clear, and the finish excellent.

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93. F. Schumann & Son, Philadelphia, Pa., U. S.

CALF-KID.

Report.—Commended for excellence of manufacture. The stock is firm but mellow, the color is clear and good, the grain is tough and strong, and the texture fine.

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94. Wm. Bush & Co., Wilmington, Del., U. S.

TAMPICO AND CAPE MAROONS AND DULL STRAIGHT GRAINS.

Report.—The maroons are remarkable for richness and regularity of color and excellence of manufacture; the dull straight grains for the fineness of the grain and its regularity over all parts of the skin; general excellence of finish.

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95. Wm. Amer & Co., Philadelphia, Pa., U. S.

TAMPICO AND CAPE FRENCH MOROCCO AND PEBBLES AND MOCHA KID.

Report.—Commended for general excellence of manufacture, being well tanned and of good color and finish.

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96. J. B. & F. M. Weed & Co., Binghamton, N. Y., U. S.

PEBBLE GRAIN.

Report.—Commended for the different styles of finish, which are of high excellence and notable for fineness of grain and softness of texture.

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97. Josiah F. Guild, Boston, Mass., U. S.

PEBBLE GRAIN, IMITATION GOAT IN COLORS, AND BUFF LEATHER.

Report.—Commended for general skill and workmanship in the manufacture.

98. **Hubner & Heller, New York, N. Y., U. S.**

OAK-TANNED CALF-SKINS.

Report.—A very fine exhibit of oak-tanned calf-skins, well tanned and finished; mellow, soft, and pliable stock; runs well in shoulders and kidneys.

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99. **G. W. Cunningham, Nashville, Tenn., U. S.**

OAK HARNESS AND WHOLE HIDE, ROUGH SLAUGHTER.

Report.—Commended for good skill and workmanship in the manufacture. Notable for clear flesh.

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100. **J. G. Hutchinson, Johnstown, N. C., U. S.**

SKINS OF DEER DRESSED.

Report.—Skins of Maraham Jack deer, dressed for gloves, etc.; skins of deer dressed, soft, tough, and skillfully handled.

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101. **Edwin Chambers, West Chester, Pa., U. S.**

OAK-TANNED CALF-SKINS.

Report.—Commended for general skill and workmanship in the manufacturing throughout.

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102. **Maynard, Ely, & Rose, Baltimore, Md., U. S.**

CALF-SKINS.

Report.—Commended for high skill in tanning and finishing, and notable for thorough workmanship.

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103. **Francis O'Callaghan, Philadelphia, Pa., U. S.**

SKIVERS TANNED AND DYED IN VARIOUS COLORS AND TINTS, AND FINISHED IN DIFFERENT STYLES FOR BOOKBINDERS' USE, POCKET-BOOK AND SATCHEL MAKERS, HATTERS, ETC.

Report.—While this exhibit is not as extensive and varied as some others, the colors are excellent, and the styles of finish exhibited are remarkable for evenness, regularity, and excellence.

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104. **A. B. Martin & Co., Lynn, Mass., U. S.**

SOUTH AMERICAN BRIGHT AND DULL FINISH STRAIGHT GRAINS, RIO HACHE IMITATION OF FRENCH KID, WHITE ALUM LAMB-SKINS, AND BLACK GLOVE SHEEP AND STRAIGHT-GRAIN CALF.

Report.—The goat stock commended for thoroughness and excellence of manufacture, fineness of grain, and clearness and brilliancy of black; white lamb-skins commended for purity and clearness of color, and fineness and elasticity of texture; the black glove sheep commended for the purity and permanence of the black; the grained calf commended for excellence of manufacture, toughness, fineness, and softness.

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105. **Wilson, Walker, & Co., Leeds, England.**

COLORED ROANS, SKIVERS, MOROCCO, SEAL-SKINS, CALF-SKINS, AND RUSSIA HIDES, FOR SHOE WORK, BOOKBINDING, POCKET BOOKS, FURNITURE, HATTERS, SATCHEL-MAKERS, AND FANCY GOODS; CHAMOIS-SKINS, PLAIN AND COLORED, FOR DOMESTIC USES AND FANCY GOODS.

Report.—We feel that we cannot too highly commend this exhibit for its extent, for the

variety of kinds of goods exhibited, for the variety, perfection, and evenness of the colors, and for the variety of styles of finish, together with the excellence in each particular. The large range of work exhibited shows the most ample resources and facilities for producing all grades of fine goods in this line in the greatest perfection.

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106. The Edinburgh Western Tanning, Currying, & Japanning Co. (Limited), Edinburgh, Scotland.

LEATHER.

Report.—The exhibit comprises fair and brown hog-skins for saddlery, japanned leather, long-grained enameled top leather, and brown bridle leather, and evinces the most thorough workmanship and skill in preparing the hides and skins, and in tanning and finishing, all of which are done in a very superior manner.

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107. John Clark & Sons, Melbourne, Victoria, Australia.

SOLE AND HARNESS LEATHER AND BASILS.

Report.—Commended for good skill and workmanship in the manufacture of the sole leather tanned with wattle bark.

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108. Wallis & Co., Melbourne, Victoria, Australia.

MOROCCO AND SHEEP-SKINS IN A VARIETY OF COLORS AND STYLES OF FINISH, FOR SHOES, BOOKBINDING, AND FURNITURE.

Report.—Commended for skill in tanning, coloring, and finishing; being notable for evenness and permanence of color and evenness and regularity of the grain. An exhibit evincing skilled workmanship.

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109. Bearley Brothers, Geelong, Victoria, Australia.

SOLE LEATHER TANNED WITH WATTLE BARK.

Report.—Commended for good skill and workmanship in the preparation of the hide and manufacture of the leather; notable for the perfection of finish and solidity of the leather.

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110. T. B. Stephens, Ekibin Tannery, Queensland, Australia.

BLACK-GRAINED AND WAX KIP; KANGAROO AND GOAT SKINS IN DIFFERENT FINISHES.

Report.—Commended for the skill and enterprise evinced; the industry, being quite new in this country, is entitled to mention for the progress made.

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111. Alderson & Sons, Sydney, New South Wales, Australia.

JAPANNED AND ENAMELED SPLIT HIDES FOR CARRIAGE AND SADDLERY WORK; ENAMELED KANGAROO-SKINS FOR BOOTS AND SHOES.

Report.—Commended for the skilled workmanship evinced in the leather, which is well tanned and worked, the japanning being very good; specially worthy of mention as evincing progress in this industry in a new country.

112. Wright, Davenport, & Co., Sydney, New South Wales, Australia.

SOLE LEATHER AND ENAMELED AND RUSSET KANGAROO-SKINS FOR BOOTS AND SHOES.

Report.—The leather is thoroughly and well tanned, and is tough and pliable. The enamel is of good color, and is tough and durable. The product evinces skilled workmanship and the realization of the resources of a new country. The sole leather is good, solid, and well tanned, and evinces thorough skill in the manufacture.

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113. Heath & Northey, Montreal, Canada.

HEMLOCK SOLE LEATHER.

Report.—Commended for high excellence in skill and workmanship throughout in the manufacture of the leather.

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114. Mosely & Ricker, Montreal, Canada.

GRAIN, BUFF, AND SPLIT LEATHER.

Report.—Commended for general good skill in the manufacture throughout.

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115. Wm. Craig & Son, Port Hope, Ontario, Canada.

TANNED AND FINISHED SHEEP AND ROANS.

Report.—This exhibit comprises saddlers' russets; wood, red, and maroon roans and law sheep; is well tanned and finished; uniform and clear colors. The law sheep is specially fine and well finished.

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116. Wladimir Tannery Co., St. Petersburg, Russia.

LEATHER.

Report.—The hides tanned whole, well prepared and well tanned, producing very firm, solid leather; willow bark tannage.

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117. Ostroem Brothers, Uleaborg, Russia.

SOLE LEATHER.

Report.—Sole leather in sides very well prepared, and Russia leather well tanned, firm, solid, and durable.

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118. Adolphus Bauerfeind, Warsaw, Russia.

RUSSIA LEATHER AND CALF FOR BOOTS, SHOES, TRUNKS, AND SATCHELS.

Report.—The exhibit evinces skilled workmanship in its tannage and finish, and by careful management and the use of approved methods and appliances, good, soft, serviceable leather is produced, at very moderate prices.

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119. Alexandrof & Alafoozof, Kazan, Russia.

HEAVY BLACK AND RED RUSSIA LEATHER FOR BOOTS AND TRUNKS.

Report.—This leather is thoroughly well tanned and finished, and evinces the most intelligent and skillful management in the different processes of manufacture.

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120. Temler & Schwede, Warsaw, Russia.

SOLE LEATHER, CARRIAGE-TOP LEATHER, AND GRAIN FINISH CALF-SKINS.

Report.—Commended for the thoroughness and skill displayed in different processes of manufacture; the top leather and grain-finish calf being especially worthy of commenda-

tion for a very high degree of skill in their manufacture, being very soft and pliable, tough, and of exceedingly good black. The top leather is not excelled by any of this style of finish coming under our observation.

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121. T. Sorokin, Moscow, Russia.

COLT-SKINS, FINISHED AND DYED FOR KID GLOVES.

Report.—This exhibit evinces the most skilled workmanship in the adaptation of a new material for this purpose. The product is of exceedingly fine texture, and very soft, elastic, and tough; the colors are very delicate, even, and fine.

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122. Holayashi Sozai, Tokio, Japan.

SOFT DEER-SKINS, TANNED AND FIGURED IN A VARIETY OF PATTERNS.

Report.—Commended for skill and ingenuity in the preparation of the skins, and the application of the colors in a variety of tasteful designs and figures, by a peculiar process, for upholstery trimmings and fine leather work.

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123. Saint-Saens Collective Exhibit of Sole Leather, St.-Saens, France.

SOLE LEATHER.

Report.—Commended for excellence, faithfulness, and skill in the preparation of the hides, and notable for the thorough workmanship in manufacturing the leather, and for solidity and fineness in the finish.

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124. Clavé Bertrand, Coulommiers, France.

SOLE LEATHER FROM DOMESTIC AND BUENOS AYRES HIDES, BELT LEATHER, HARNESS LEATHER, CALF-SKINS, LEATHER STRAPS FOR WOODEN SHOES.

Report.—Commended for the high skill and superior workmanship in the preparation of the hide and manufacture of the leather.

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125. A. Fortier-Beaulieu, Paris, France.

SOLE LEATHER FOR SADDLERY, HOG-SKINS FOR SADDLERY AND FURNITURE, DYED SHEEP-SKINS, AND GRAINED LEATHER FOR CARRIAGE-TOPS.

Report.—This is a very superior exhibit. Commended for the skill and thorough workmanship in tanning and finishing; the colors are clear and uniform, and the product is first-class.

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126. F. Sueur & Son, Paris, France.

GRAINED AND ENAMELED LEATHER, BLACK AND IN FANCY COLORS, FOR CARRIAGES AND SHOW PURPOSES, PLAIN BLACK VARNISHED LEATHER FOR CARRIAGES, HARNESS, AND MILITARY EQUIPMENTS.

Report.—All the varieties of leather finished in this manufactory are tanned and worked through all the different processes in their own factory, and are noticeable for the thoroughness and excellence of workmanship. The leather is soft and pliable, and the varnish or japan, while being smooth and of excellent color and gloss, is remarkably tough and durable, not liable to stick or break.

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127. Sorro Brothers, Millau, Aveyron, France.

BLACK CALF-SKINS.

Report.—The female skins of the exhibit are fine, plump, well filled in the flanks, and of good general quality.

128. A. Basset & Co., Paris, France.

BLACK GLACE AND MATT KID, AND FANCY COLORED KID FOR LADIES' FINE SHOES AND SLIPPERS.

Report.—This line of goods is a specialty with Mr. Basset, in which he has attained to a degree of excellence especially in his black kid, as to softness and toughness, with clearness of black, and brilliancy of gloss and permanency of the same, which is unequaled by any coming under our observation. His fancy colors are clear, fine, and of generally excellent qualities.

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129. Jules Allain, Paris, France.

BLACK MOROCCO IN STRAIGHT GRAINS, DULL AND BRIGHT PEBBLES, AND PLAIN FINISH IN OIL.

Report.—Commended for thorough and skillful workmanship in the manufacture, and good stock.

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130. Bayvet Brothers, Paris, France.

FANCY COLORED AND BLACK MOROCCO IN A VARIETY OF COLORS AND STYLES OF FINISH, FANCY-COLORED SHEEP-SKIN, AND COLORED CALF.

Report.—The exhibit comprises a full line of morocco and skeep-skins in all the different colors and finishes, suitable for books, pocket books, upholstery, and shoes, and for beauty and evenness of color and excellence of finish is unsurpassed.

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131. Duchesne Brothers, Paris, France.

MOROCCO IN BLACK AND FANCY COLORS AND A VARIETY OF STYLES OF FINISH.

Report.—This exhibit is a very extensive one, and varied as to colors and styles of finish. It is especially noteworthy for the regularity, evenness, and perfection of the grain and color in the levant grain and pebbles, both in black and fancy colors, for books, satchels, carriages, furniture, and shoes. The color is beautifully clear and even, and the stock mellow, tough, and thoroughly well manufactured.

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132. Ocreman & Witdoeck, Malines, Belgium.

ENAMELED AND PATENT LEATHER.

Report.—Commended for high skill and workmanship in the preparation and manufacture throughout.

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133. J. Lebermuth & Co., Brussels, Belgium.

GOAT MOROCCO IN PEBBLES, LONG AND LEVANT GRAIN, AND FINISHED CALF-SKINS.

Report.—Morocco. Commended for fineness of grain and good color, and for good workmanship in tanning and finishing; calf-skins commended for fineness of texture and finish, smoothness, and suppleness.

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134. Francisco Cazador Martin, Castellon, Spain.

GOAT AND SHEEP MOROCCO.

Report.—Commended for skill in tanning, coloring, and finishing.

135. **Antonio Cort Sotorra, Reus, Spain.**

BLACK AND FAIR PEBBLES (OR SHAGREEN) MOROCCO, AND GRAIN-FINISHED CALF.

Report.—This exhibit evinces skill and careful workmanship in the tanning and finishing; the stock is mellow and tough, the color good, and the grain even and good.

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136. **Widow Machado & Sons, Torres Novas, Santarem, Portugal.**

WHOLE HIDE OAK SOLE LEATHER.

Report.—Commended for high skill and superior workmanship in the preparation of the hide and manufacture of the leather.

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137. **Antonio Domingos d'Oliveira Gama, Oporto, Portugal.**

OAK SOLE LEATHER.

Report.—Commended for general skill and workmanship in the manufacture.

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138. **Jose Maria d'Andrade & Brothers, Valença, Portugal.**

OAK SOLE LEATHER.

Report.—Commended for general skill and workmanship in the manufacture.

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139. **Rodrigo Antonio Leite de Moraes, Oporto, Portugal.**

OAK SOLE LEATHER.

Report.—Commended for general skill and workmanship in the manufacture.

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140. **João Luis Smidt, Oporto, Portugal.**

TANNED CALF-SKINS, BLACK AND RUSSET FINISH.

Report.—Commended for good quality of skins, being well tanned and finished. The leather is of fine texture, and fairly filled up.

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141. **Francisco F. Godhino, Lisbon, Portuga**

BARK-TANNED GOAT, SHEEP, CALF, AND KIP SKINS, AND SOLE LEATHER.

Report.—The exhibit evinces a good degree of skill and thorough workmanship in the tanning and finishing, the goat and sheep skins being well tanned and worked throughout; the calf and kip skins are well handled and fairly well finished; sole leather well prepared and tanned, and very well finished.

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142. **Antonio Sypriana, Lisbon, Portugal.**

BARK-TANNED SHEEP-SKINS FOR SADDLERY, ETC., BARK-TANNED GOAT-SKINS, RUSSET FINISH, FOR SHOES.

Report.—The tannage and workmanship are good; the skins are well finished, but the style of finish of the goat-skins is only suitable for home market.

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143. **Imperial Tannery, Beicos, Turkey.**

LEATHER MOROCCO AND SHEEP-SKINS.

Report.—This exhibit is extensive and varied, comprising heavy leather for boots and portmanteaus, calf patent leather, Russia leather, and morocco. In common with the entire

leather exhibit of Turkey, it has been badly cared for, and is much damaged and the finish injured. It is thoroughly tanned, and the colored morocco, especially the red, blue, and yellow, is notable for the beauty, evenness, and permanence of the colors.

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144. General Commission for the National Exhibits, Rio de Janeiro, Brazil.

HIDES, SKINS, LEATHER, AND SADDLERY.

Report.—The exhibit comprises shoes from the province of Rio Grande do Norte; leather suit harness, used by herdsmen, from the province of Ceará; saddle from province of Santa Catharina; a collection of skins of animals from province of Matto Grosso; panther and other skins from province of Goyaz; collection of skins of animals from province of Parana; hides and leather from province of Rio Grande do Norte; skins of animals from province of Alagoas; skins of animals from province of Amazonas; hides and leather from province of Ceará; and hides and leather from province of São Paulo. It is an instructive exhibit, illustrating the different animals of Brazil, and the condition of the leather industry, etc., of this great empire.

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145. J. Feydel & Son, Rio de Janeiro, Brazil.

COLLECTION OF TANNED SKINS AND LEATHER.

Report.—This exhibit consists of a collection of skins of various kinds of animals, including a large spotted steer hide tanned with the hair on, and samples of russet grain kip and calf and other leather, and evinces skill in the preparation and tanning throughout, the skins tanned with the hair on being specially notable for the excellence in their preparation.

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146. Jose A. Coltho, Province of São Paulo, Brazil.

SKIRTING LEATHER FOR SHOE SOLES.

Report.—Commended for the skill evinced in the preparation of the hides, and in the tanning and finishing, being well tanned, very clean on the flesh, solid, and pliable.

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147. F. Gomes dos Santos, Lima, Province of São Paulo, Brazil.

SHOE SKIRTING AND SOLE LEATHER.

Report.—This leather evinces skill in its manufacture, being well prepared, tanned, and finished. Is firm, pliable, good leather.

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148. Desideri Letallos, Salta, Argentine Republic.

LEATHER.

Report.—This exhibit consists of harness and other leathers; is well tanned and finished, being solid and pliable and of good color and good smooth grain.

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149. Ocampo & Acosta, Cordoba, Argentine Republic.

LEATHER.

Report.—This exhibit comprises fair or russet grain leather and other leathers, and is well tanned and finished, suited to home market.

150. Santillan Brothers, Santiago, Argentine Republic.

LEATHER.

Report.—This is a large exhibit, comprising sole leather, calf-skins, grain leather, etc. It is well tanned throughout, and is finished to suit the wants of their home market. The calf-skins are specially noticeable for their exceeding fineness of texture, suppleness, and toughness.

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151. Antoni Varale, Biella, Italy.

OAK-TANNED BELT LEATHER.

Report.—Commended for general skill and workmanship in the preparation of the hide and manufacture of the leather.

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152. Nicolo Baluffi & Sons, Chiaravalle, Italy.

SOLE LEATHER TANNED WITH VALONEA AND OAK-BARK.

Report.—This product is notable for high skill in the preparation of the hide and the perfection of the manufacture.

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153. Casarino Marcello, Genoa, Italy.

OAK SOLE LEATHER.

Report.—Commended for general good skill in the preparation of the hide and manufacture of the leather.

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154. Agostino Baldini & Co., Pescia, Lucca, Italy.

OAK SOLE LEATHER.

Report.—Commended for high skill and superior workmanship in the preparation of the hide and manufacture of the leather.

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155. Pietro Mercurelli, Fabriano, Italy.

SHEEP-SKINS TANNED AND DYED IN VARIOUS COLORS AND FINISHED IN DIFFERENT COLORS.

Report.—Commended for good colors and workmanship in the manufacture, showing progress in this industry. Suitable for their home market.

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156. George Schaller, Lahr, Germany.

COLORED MOROCCO.

Report.—The exhibit is remarkable for the delicacy and purity of the colors and excellence of finish. A superior exhibit as to extent and variety of shades and colors and excellence of manufacture.

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157. Emanuel Meijer, Berlin, Germany.

COLORED KID GLOVE LEATHER.

Report.—Commended for fineness of texture, elasticity, variety and excellence of colors, and general excellence of manufacture.

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158. Carl Simon's Sons, Kirn-on-the-Nahe, Germany.

BLACK AND COLORED MOROCCO AND GRAIN CALF.

Report.—This is a very extensive exhibit, comprising black and fancy colored morocco in all the styles of finish, for the varied wants of the trade, and evinces skillful workmanship in tanning, coloring, and finishing.

159. **Philip Jacob Spicharz, Offenbach, Germany.**

BLACK AND BRONZE GLACE KID AND MATT KID.

Report.—This is a small exhibit, but evinces a good degree of skill and workmanship, the color being clear and permanent, the grain tough, and the texture fine and supple.

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160. **Adolf Jellinek, Lieben, near Prague, Austria.**

WHITE KID GLOVE LEATHER.

Report.—Commended for general excellence of quality; being very soft, fine, and elastic, and uniform and clear in whiteness.

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161. **H. M. Eckstein, Lieben, near Prague, Austria**

WHITE KID GLOVE LEATHER.

Report.—Commended for superiority of manufacture, being of the finest texture, very tough and elastic, and pure, clear white.

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162. **A. H. Suess & Sons, Vienna, Austria.**

MOROCCO IN VARIETY OF COLORS FOR SHOES, BOOKBINDING, POCKET BOOKS, AND FANCY GOODS.

Report.—Commended for general excellence of colors and finish, comprising a great variety of shades and colors, which are full and clear.

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163. **Franz Schmitt, Vienna, Austria.**

CALF-SKINS.

Report.—Commended for skill and workmanship in the manufacture throughout.

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164. **I. Foges, Vienna, Austria.**

CALF PATENT LEATHER, WAX CALF, ARMY BOOT LEATHER, AND DICED CALF AND GRAIN LEATHER; ALSO GOAT-SKINS LEATHER IN VARIETY.

Report.—This exhibit indicates high skill and good workmanship in the manufacture, throughout.

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165. **Dalens Tannery, Flekkefjord, Norway.**

OAK SOLE LEATHER.

Report.—Commended for high skill and superior workmanship in the preparation of the hides and manufacture of the leather.

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166. **A. Tönneson, Christiania, Norway.**

HARNESS, RUSSET, BOOT AND BOARDED GRAIN LEATHER.

Report.—Commended for skill and workmanship in the manufacture.

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167. **Fossens Tannery, Flekkefjord, Norway.**

OAK SOLE LEATHER.

Report.—Commended for high skill and superior workmanship in the preparation of the hides and manufacture of the leather; notable for mellowness and fineness of grain.

168. **Klem Hansen & Co., Trondhjem, Norway.**

OAK-TANNED SOLE LEATHER.

Report.—Commended for high skill and workmanship in the preparation of the hides and manufacture of the leather.

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169. **Samuel B. Meyer, Bergen, Norway.**

SOLE LEATHER MARKED "A," "B," "C."

Report.—Commended as showing high skill and superior workmanship in the manufacture, throughout.

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170. **Flekkefjord Tannery, Flekkefjord, Norway.**

OAK SOLE LEATHER.

Report.—Commended for high skill and superior workmanship in the preparation of the hides and manufacture of the leather.

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171. **Leather Dressers' Corporation, Smyrna, Turkey.**

LEATHER, CALF-SKINS, MOROCCO, AND SHEEP-SKINS.

Report.—This corporation exhibits patent leather, calf-skins, morocco, and sheep-skins, all of which are evidently well tanned; but the exhibit has been so badly damaged by exposure and want of proper care that the finish has been much destroyed. The exhibit is notable principally for the excellence of color in the red and yellow morocco.

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172. **Serano Brothers, Caraccas, Venezuela.**

SOLE LEATHER.

Report.—Commended for skill and workmanship in the preparation of the hide and manufacture of the leather.

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173. **Edwin C. Burt, New York, N. Y., U. S.**

LADIES' FINE MACHINE-SEWED SHOES.

Report.—Commended for superiority of workmanship, lightness and fineness of work; bevel edge and gallooning; sewed on the McKay & Goodyear sewing machine; in variety of color of satin, beautifully embroidered in French and brush kid, with Wurtemberg, French, and other styles of heels, straight grain, double soles, walking and dress gaiters; for stitching on uppers very fine with the Gordon stay seam; for correct proportions insuring comfort to the wearer. An extremely fine exhibit.

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174. **C. H. Fargo & Co., Chicago, Ill., U. S.**

MEN'S, WOMEN'S, AND BOYS' HEAVY BOOTS AND HIGH SHOES.

Report.—Good, substantial grain and wax leather peg boots and shoes; fur-lined skins tanned with hair on heavy peg boots and high shoes for winter wear—made of good prime stock—extra full soles for Western sales; also a child's shoe with tip or cap formed from sole to protect uppers; very serviceable.

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175. **Mayer & Stern, Philadelphia, Pa., U. S.**

LADIES', MISSES', AND CHILDREN'S MEDIUM GRADE MACHINE-MADE SHOES AND LADIES' AND INFANTS' HAND TURN SHOES.

Report.—Commended for good workmanship and finish, combined with good materials and proportion in the shoes, resulting in a very good shoe of this class for wholesale trade.

176. Henry Leh & Co., Allentown, Pa., U. S.

LADIES', MISSES', AND CHILDREN'S MACHINE-SEWED AND HEAVY MINING BOOTS AND BROGANS.

Report.—A good exhibit of women's, misses' and children's; heavy and substantial, mainly for country wear; prime stock and workmanship, and good, full-fitting, and strong work. The heavy mining boot, brogan, and buckle shoe are very superior articles for purposes intended. Prices of goods very reasonable.

177. Thomas Fearey & Sons, Albany, N. Y., U. S.

LADIES', MISSES' AND CHILDREN'S, BOYS' AND YOUTHS' MEDIUM GRADE MACHINE-SEWED SHOES.

Report.—An extensive exhibit of medium grade machine-sewed shoes for the masses; good serviceable work; material prime; proportions good; prices reported very low.

178. Banister & Tichenor, Newark, N. J., U. S.

HAND-STITCHED (TEAM) AND MACHINE-SEWED BOOTS, SHOES, AND GAITERS.

Report.—Commended, first, for the extent and variety of the exhibit, consisting of over two hundred pairs of boots, shoes, and slippers, of different sizes and styles.

Second, for the excellence and uniformity of the workmanship in the fitting and bottoming of the work. Especial attention has been given to the proper proportions of their shoes, the forms of all lasts and all patterns used in the factory being originated and gotten up by themselves.

We would mention the following styles, among others, as possessing special merit:

City Troop's boots; fisherman's high grain leather boot, leg cut in one piece; morocco leg tongue boot; jockey, riding, walking, and dress boots, with box and plain toes; youths' tongue boots; bellows tongue walking shoe; double inseam cork sole shoe; Congress gaiters, in variety of styles; strap shoes, with buckles and ties; and leather and cloth embroidered parlor slippers.

179. Burt & Mears, New York, N. Y., U. S.

MEN'S FINE HAND-STITCHED TEAM-WORK BOOTS, SHOES, AND GAITERS.

Report.—A very fine exhibit of men's fine, high, riding, extension, double soles, Scotch edge, morocco leg, calf tongue boots; very excellent workmanship; well cut and lasted; prime material, got up in artistic styles; also fine calf gaiters, Alexis ties, French kid strap shoes, etc., for wholesale trade; also fancy stitching on boot legs and embroidered slips, showing taste in design and skillful execution; workmanship and material of first quality, and proportions excellent; a very creditable exhibit.

180. Miller, McCullough, & Ober, Newark, N. J., U. S.

MEN'S HAND-STITCHED TEAM OR GANG WORK FOR WHOLESALE.

Report.—A small but very creditable display; calf dress, walking double sole, fisherman; high and morocco leg tongue boots; also bellows tongue Scotch bottom shooting shoes, double inseam cork soles; dress and walking gaiters without seam in front. A variety of styles and widths to suit different sections; box and plain toes; claim specialty for supplying to measure retail customers; good, prime material and workmanship.

181. C. Benkert & Son, Philadelphia, Pa., U. S.

GENTS' FINE CUSTOM HAND-SEWED BOOTS, SHOES, AND GAITERS.

Report.—Commended for superiority of workmanship, as well as excellence of material used; for correct proportions, insuring comfort to the wearer; consisting of riding, City

Troop style, boots for equestrians, walking boots, gaiters, etc., terraced, quilted, and double inseam cork sole; the fitting on uppers excellent, principally by hand; a very superior exhibit of work.

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182. Edwin A. Brooks, New York, N. Y., U. S.

MEN'S AND LADIES' CORK-SOLE BOOTS, SHOES, AND GAITERS.

Report.—A superior double inseam or box cork sole, by inserting two or more pieces of cork, made light for summer and heavy for winter wear; superior in material, workmanship, fit, and durability; also a short quarter gentlemen's strap walking shoe, cut without seam at sides, avoiding the pressure on the outside bone of the foot.

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183. Ernest J. Thierry, New York, N. Y., U. S.

GENTS' GAITERS, HIGH AND LOW SHOES, AND SLIPPERS, CUSTOMER WORK.

Report.—A very fine display of gaiters and shoes, of superior workmanship on uppers and soles (black stitch); style and fit excellent.

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184. Foster & Quiggle, Milford, Mass., U. S.

MEN'S AND BOYS' FINE SCREW-FASTENED SHOES AND GAITERS.

Report.—An excellent exhibit of hand-screwed walking (bellows tongue) Alexis ties and gaiters, very securely fastened, springy to foot; prime stock, good workmanship, and excellent fitting goods.

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185. Ara Cushman & Co., Auburn, Me., U. S.

PEG, SCREW, AND MACHINE-SEWED BOOTS, SHOES, AND SLIPPERS.

Report.—An exhibit of men's grain calf and kid boots and shoes; grain calf, goat, and carpet slippers; serge opera boots and canvas base-ball shoes; also women's, misses', and children's polish boots, cloth and leather slips; good prime work and materials; claiming durability and service for least money for the masses.

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186. Frederick Jones & Co., Boston, Mass., U. S.

MEN'S AND BOYS' HEAVY PEGGED AND SCREWED BOOTS AND SHOES.

Report.—A good variety and assortment of substantial, well-finished work, prime stock; particular attention to the grading of widths; at low prices for the masses.

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187. E. & A. H. Batcheller & Co., Boston, Mass., U. S.

MEN'S, YOUTHS' AND BOYS', AND WOMENS' AND MISSES' NAILED AND PEGGED BOOTS, SHOES, AND BROGANS.

Report.—The workmanship is good and substantial, and the material prime, for this class of work; well proportioned for fit and comfort; would mention specially their plow shoe and standard brogan, for superior and serviceable qualities. These goods are produced at moderate prices, to supply the masses.

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188. Jenkins, Lane, & Sons, Boston, Mass, U. S.

MEN'S PEGGED AND SCREWED BOOTS AND SHOES.

Report.—An extensive variety of calf split buff and grain leather boots and shoes, well cut; workmanship smooth and well finished; prime good stock; same variety of fancy patent leather work; low prices for the masses.

189. **Allen, Gates, & Brother, Philadelphia, Pa., U. S.**

WOMEN'S THIN-SOLED GAITERS AND SHOES SEWED BY CUTLAN'S MACHINE.

Report.—A very fine exhibit of ladies' black and colored French kid button and lace gaiters; also white and colored satin with French Pompadour heels, well seated and very handsomely finished; uppers embroidered and finely stitched; well cut and lasted; also very nice low-cut shoes and slippers. All the above are sewed on the Cutlan turn sewing machine; workmanship and material excellent; fit and proportions good. A very creditable display.

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190. **H. & A. Mahrenholz, New York, N. Y., U. S.**

BOOTS MADE FROM ALLIGATOR SKIN.

Report.—Riding boots of alligator skin; workmanship solid and strong. The leather is tough, mellow, and skillfully handled.

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191. **Thomas Emerson's Sons, Boston, Mass., U. S.**

GENTS' HAND-MADE TEAM-WORK; MACHINE-SEWED AND HAND-MADE SHOES AND HERSOME GAITERS.

Report.—Good, substantial, nicely-finished work, with prime material; stitching and fitting of uppers very fine. The Hersome gaiter is a very handy and convenient style of gaiter, fastened by a strap and buckle around the ankle; good-proportioned work, with a variety of styles of toes, box and plain.

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192. **Isaac Prouty & Co., Spencer, Mass., U. S.**

MEN'S, YOUTHS', AND BOYS' HEAVY PEG WORK.

Report.—Prime stock; good substantial workmanship; well cut, and excellent fitting; also heavy nailed work for miners' use.

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193. **Fogg, Houghton, & Coolidge, Boston, Mass., U. S.**

MEN'S, BOYS', AND YOUTHS' NAILED, PEGGED, AND MACHINE-SEWED BOOTS AND SHOES.

Report.—This exhibit shows good smooth work, well cut and made of prime stock. It embraces a great variety of styles and qualities, to meet the wants of the general trade, at low prices.

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194. **R. W. Emerson & Co., Boston, Mass., U. S.**

LADIES', MISSES', AND CHILDREN'S PEGGED BOOTS AND SHOES.

Report.—A very good exhibit of fine pegged boots and shoes, for women, misses, and children, made for home and Mexican markets. A variety of styles of fancy uppers, displaying considerable taste in design, suited to special market; workmanship and stock good.

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195. **Krippendorf & Hart, Cincinnati, Ohio, U. S.**

WOMEN'S, MISSES', AND CHILDREN'S MACHINE-SEWED WORK.

Report.—Commended for good workmanship, material, proportions, and style; suitable for wholesale trade.

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196. **Stribley & Co., Cincinnati, Ohio, U. S.**

WOMEN'S, MISSES', AND CHILDREN'S MEDIUM GRADE MACHINE-SEWED SHOES.

Report.—The work is well and substantially made, of prime materials, and the style and proportions are good; suitable for wholesale trade.

197. **Ordway & Clark, Haverhill, Mass., U. S.**

WOMEN'S SHOES.

Report.—Hand and machine sewed shoes, medium grade, and kid and satin hand-sewed low shoes and slippers. The materials are prime, and the general workmanship, both in the fitting and finishing, is very good. The styles are tasty and proportions good.

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198. **M. D. Wells & Co., Chicago, Ill., U. S.**

MEN'S, WOMEN'S, AND CHILDREN'S HEAVY PEG AND SCREW BOOTS.

Report.—A very excellent exhibit of heavy peg and screw work, consisting of Montana miners' top soles, lumbermen's and drovers' kip boots, English walking shoes, miners' slug-nailed shoes, kip dirt-excluders, etc.; good prime material and workmanship for Western market.

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199. **E. F. Bancroft & Co., Lynn, Mass., U. S.**

SHOES AND SLIPPERS.

Report.—Women's and misses' shoes and slippers, and men's fancy slippers, medium grade. The style, proportion, and fit are very good, and the workmanship on soles and uppers excellent. Women's low shoes and slippers and men's slippers are deserving of mention for taste and proportions, at moderate prices.

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200. **W. F. Breed, Dole, & Co., Lynn, Mass., U. S**

WOMEN'S SHOES.

Report.—Machine-sewed shoes, kid, goat, and serge gaiters, shoes, and slippers. Commended for fair workmanship, good material, style, and finish peculiar to Lynn.

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201. **Geo. C. How, Haverhill, Mass., U. S.**

LADIES' HAND-SEWED SLIPPERS AND LOW SHOES.

Report.—A fine assortment of low shoes and slippers in black and fancy-colored kid and satin; handsomely-stitched and tasty uppers, and fair workmanship. Full shoe for wholesaling; style peculiar to Haverhill.

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202. **Moses How, Haverhill, Mass., U. S.**

GAITERS AND SLIPPERS.

Report.—Ladies' and misses' hand and machine sewed gaiters and slippers, in black and fancy-colored morocco, kid, and satin. Commended for good variety and fair workmanship; style peculiar to Haverhill.

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203. **Lilly, Young, Pratt, & Brackett, Boston, Mass., U. S.**

MEN'S, BOYS', AND YOUTHS' HAND-STITCHED TEAM BOOTS AND SHOES; MEN'S, BOYS', AND YOUTHS' MACHINE-SEWED AND SCREWED BOOTS AND SHOES.

Report.—The exhibit comprises a very extensive assortment of a great variety of styles to suit the various markets. The exhibitors claim it to be a fair sample of their regular production. The workmanship, material, and proportions are good. The goods are substantial and serviceable, and suited to the wants of the wholesale trade.

204. **Kelley & Moore, Philadelphia, Pa., U. S.**

LADIES' FINE MACHINE-SEWED GAITERS AND HAND-SEWED SLIPPERS.

Report.—Commended for superiority in machine-sewed work in fit, workmanship, and material, finish on edge, sole, and heel, together with general finish. A fine exhibit of white and black satin button, blue satin side-lace gaiters, imitation cork soles, walking and dress shoes; also French kid sandals, creole slippers, uppers very handsomely stitched and beaded. A very creditable exhibit and excellent-fitting shoes.

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205. **J. H. Richelderfer, Philadelphia, Pa., U. S.**

GENTS', LADIES', AND CHILDREN'S OVER-GAITERS AND HUNTING AND RIDING LEGGINGS.

Report.—A great variety of gents', ladies', and children's over-gaiters in leather, cloth, velveteen, and satin, in colors; patent springs and buttons; also enameled leather hunting and riding leggings. Commended for superiority of cut and proportions, and for style, taste, and workmanship.

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206. **Adler & Clement, Baltimore, Md., U. S.**

LADIES', MISSES', AND CHILDREN'S MEDIUM GRADE MACHINE-SEWED SHOES.

Report.—Commended for superior workmanship in the fitting and finish, for the proper proportions of the shoes, and for the good quality of material used.

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207. **Connolly & Power, Boston, Mass., U. S.**

HAND SEWED AND STITCHED BOOTS, SHOES, AND GAITERS.

Report.—Commended for superiority in style, for correct proportions, insuring comfort to the wearer, and for superiority of workmanship, as well as for excellence of material used. We would especially mention their double inseam or box cork sole boots, patent leather work, etc.

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208. **West Brothers, Philadelphia, Pa., U. S.**

LADIES', MISSES', CHILDREN'S, AND INFANTS' MACHINE-SEWED SHOES.

Report.—Good, substantial work and material. Full line for wholesale trade.

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209. **Goodrich & Porter, Haverhill, Mass., U. S.**

LADIES' MACHINE AND HAND SEWED BOOTS AND SHOES.

Report.—Good, prime material and fair workmanship for jobbing trade.

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210. **J. H. & G. M. Walker, Worcester, Mass., U. S.**

MEN'S, BOYS', AND YOUTHS' HEAVY PEG BOOTS.

Report.—An exhibit of wax upper and kip heavy peg boots for men, boys, and youths; prime stock and good workmanship.

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211. **Nelson M. Johnson, St. Louis, Mo., U. S.**

GENTS' CUSTOM-MADE BOOTS AND GAITERS.

Report.—A fair exhibit of custom work, consisting of enameled leg, calf and alligator vamp riding boots, patent leather and enameled tongue boots, terraced bottom long gaiters, very elaborately embroidered slippers, very good material and substantial work; fitting on boot-legs done by hand, and very nice.

212. Barrows & Boyd, New York, N. Y., U. S.

LADIES' MCKAY MACHINE-SEWED GAITERS.

Report.—A very elaborate and superior exhibit of machine-sewed shoes, with Wurtemberg and Louis XIV. heels, consisting of pebble goat button extension edge, box toe, cork soles, handsomely seated; oil goat button double sole extension edge; glove kid, patent leather vamps, side lace, double soles, light bead-edge shank, sixty-four lifts on heel, nicely jointed and seated; French kid, button, very light sole, Louis XIV. heel, handsomely finished; pink and blue kid button, rand cork soles, Louis XIV. heel; a seamless Newport button, exceedingly light; white, amber, red, green, and brown satin button gaiters, embroidered, and very elaborate stitching on uppers and workmanship on soles; amber satin, lavender, and pink kid high shoes, very superior in workmanship, material, and style. Made on a Paize last to show off workmanship and style, but not to fit the foot.

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213. Jacob Zaun & Son, Philadelphia, Pa., U. S.

HAND-MADE BOOTS AND SHOES FOR CUSTOM TRADE.

Report.—The exhibit evinces skill and taste in cutting and fitting, the stock used is excellent, and the workmanship throughout is good. The line of work is suited for first-class custom trade. We would specially mention their Napoleon City Troop and Crown Prince wrinkled-ankle riding boot for their correctness of proportion and superiority of workmanship.

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214. A. R. De Haven & Son, Philadelphia, Pa., U. S.

LADIES' HAND-MADE CUSTOM-WORK GAITERS.

Report.—A small but very fine display of hand-made work, excellent workmanship and material, good fitting and style; consists of cloth top, patent leather, foxed, terraced, and plain Scotch bottom, kid, double inseam cork soles, cut in one piece; white kid and satin dress shoes, with pump sole and fancy heels; children's kid and morocco dress and walking shoes.

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215. Stephen Oliver, Lynn, Mass., U. S.

LADIES' FINE HAND-SEWED GAITERS, LOW SHOES, ETC., AND GENTS' FINE SLIPPERS.

Report.—Good, prime material and workmanship, tasty in style, and well-proportioned work.

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216. L. Falley & Co., Lafayette, Ind., U. S.

MEN'S, WOMEN'S, AND CHILDREN'S HEAVY PEG WORK.

Report.—An exhibit of prime, heavy men's, boys', and youths' peg boots and high shoes, very strong, substantial work, and good, prime materials, suitable for Western trade.

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217. S. D. Sollers & Co., Philadelphia, Pa., U. S.

CHILDREN'S AND INFANTS' BOOTS AND SHOES, HAND-SEWED, MCKAY AND GOODYEAR MACHINE-SEWED.

Report.—A very extensive and elaborate exhibit of children's and infants' shoes of every conceivable pattern and style; fancy and embroidered uppers, with extra stitching; material and workmanship good; fit and style good.

218. Bay State Shoe & Leather Co., New York, N. Y., U. S.

MEN'S, BOYS', YOUTHS', WOMEN'S, MISSES', AND CHILDREN'S BOOTS AND SHOES, SEWED, PEGGED, AND SCREWED.

Report.—An exhibit of over two hundred and fifty pairs of various styles of heavy and prime, good, serviceable work, specially adapted to the wants of the working classes, at extremely low prices. Especial notice is called to the heavy and prime outsole on work.

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219. Kenney & McPartland, New York, N. Y., U. S.

LADIES' FINE MACHINE-MADE FRENCH KID AND STRAIGHT-GRAIN SHOES, IN VARIETY OF STYLES.

Report.—Commended for good workmanship on uppers and bottoms, and the use of the best materials, the style and proportions of the shoes being good.

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220. Laird, Schober, & Mitchell, Philadelphia, Pa., U. S.

CHILDREN'S AND INFANTS' MACHINE AND HAND SEWED SHOES.

Report.—A very handsome exhibit of children's and infants' gaiters, boots, and ties, in a variety of styles, Pompadour heels, French edge, bead edge, low, broad, and spring heels. Commended for excellent workmanship and material, good-fitting proportions and finish, uppers handsomely stitched; children's blue and silver French kid, side lace and button, opera toes, Pompadour heels; infants' blue, cherry, and black satin button; infants' white, French, and matt kid button; infants' gold and blue French kid and buckle ties; full extension soles, Joyce protection toes, and cork soles. Deserving of special notice.

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221. Gray Brothers, Syracuse, N. Y., U. S.

LADIES' FINE HAND-MADE WELT WORK SHOES, GAITERS, ETC.

Report.—Commended for superiority in workmanship in hand-made welt work; finish of heel, soles, and edge; pin-point work on soles and top-piece very fine; fineness of stitch on welt and cork sole work; the lasting of upper and style of last; heels very high set under foot, so as to stand easily and support weight of body; uppers very finely stitched, with beaded edges; fit and proportions good. A very superior exhibit.

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222. Waldo M. Claflin, Philadelphia, Pa., U. S.

MEN'S AND BOYS' HAND-SCREWED (OR ESTERBROOK SCREW) BOOTS, GAITERS, AND HIGH SHOES.

Report.—A small but very good display of men's and boys' gaiters and high shoes, made with Esterbrook & Wires' screw. A very springy, pliant, and durable shoe; also heavy double soles, impervious to water, at prices within the reach of the masses. Workmanship, fit, and proportions good; material prime.

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223. M. B. & I. Canfield, Newark, N. J., U. S.

MEN'S HAND-STITCHED TEAM WORK.

Report.—An excellent display, consisting of men's double inseam cork soles, morocco leg, tongue, patent leather boots, etc., well cut and nicely lasted; Alexis ties (tongues in one piece), Congress gaiters, French kid strap shoes. A great variety of styles and widths to suit different sections, with box and plain toes. Commended for excellent material and workmanship, good proportions, and durability.

224. John Lobb, London, England.

GENTLEMEN'S AND LADIES' SUPERIOR HAND-MADE CUSTOM BOOTS AND SHOES.

Report.—A very superior exhibit of workmanship, material, style, and proportions, consisting of gentlemen's dress, walking, shooting, fishing, hunting, and riding boots, with patent calf button gaiters, calf and grain high and strap shoes; extra stitching and workmanship very elaborate; ladies' gaiters and slippers very fine; the workmanship cannot be surpassed in any country. A portion not fresh work.

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225. Wm. Allen Roe, Leicester, England.

McKAY MACHINE-SEWED MEN'S BOOTS, HIGH AND LOW SHOES.

Report.—A very excellent exhibit of machine-sewed work, with double rows of sewing, and very substantial, material prime, consisting of extra strong shooting boots, wide welts, two rows of sewing, enamel cow hide, imitation cork sole, fair stitch on top sole; glove kid low shoe, imitation cork sole; jockey boots, and patent riding, dress, and walking boots; ladies' high leg boots; army boots, as worn by the British army; double row of sewing.

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226. John Rosier, Melbourne, Victoria, Australia.

FINE HAND-MADE BOOTS AND SHOES FOR CUSTOM TRADE.

Report.—This exhibit consists of gentlemen's fine calf and patent leather boots and gaiters, and ladies' fine shoes, and is notable for skillful workmanship, prime material, excellent taste and styles, and correct proportions.

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227. David Ramsey, Cobourg, Ontario, Canada.

GENTLEMEN'S HAND CUSTOM-MADE BOOTS AND SHOES.

Report.—A small but very handsome exhibit of patent, calf, button, and Congress gaiters, high lace, bellows tongue, double inseam cork sole shoe, calf button gaiters. Very superior workmanship and material, with excellent taste and fitting proportions.

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228. Nicholas Huebner, St. Petersburg, Russia.

BOOTS AND SHOES; CALF AND HORSE-HIDE BOOTS AND GAITER FRONTS; HIGH RIDING AND FISHERMEN'S BOOTS; GALOSHES FOR OVERSHOES, LIGHT BOOTS AND GAITERS.

Report.—Workmanship good; style and proportions suitable only for their own market; also an exhibit of calf-skin (fair) and horse-hide boot and gaiter fronts and backs.

A very excellent tanned leather, with very fine flesh and beautiful grain.

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229. Basil Bogdanof, St. Petersburg, Russia.

BOOTS AND SHOES, SLIPPERS, CAPS, AND CUSHIONS FOR WHOLESALE TRADE.

Report.—This is a very extensive and varied exhibit, comprising long hunting and riding boots, walking boots and shoes, ladies' shoes and slippers, and stage boots, shoes, and slippers.

The workmanship is excellent, and the exhibit is especially noteworthy for taste and skill in the combination of fine materials and for ornamentation in very fine gold embroidery.

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230. Basil Fominsky, Kongoor, Perm, Russia.

HUNTING, RIDING, AND MINING BOOTS.

Report.—The workmanship is solid, substantial, and honest, and the materials prime. The product is first-class for this line of goods, and is especially adapted to the wants of their home trade.

231. Theodore Tzelbeief, St. Petersburg, Russia.

MEN'S AND WOMEN'S BOOTS, SHOES, AND SLIPPERS FOR WHOLESALE TRADE.

Report.—This is an extensive and varied exhibit, comprising men's walking boots, shoes, and gaiters, women's shoes and slippers, and stage and fancy shoes. The workmanship is good, and the styles varied. Adapted to the wants of their home trade.

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232. Peter Laude, St. Petersburg, Russia.

GENTS' FINE BOOTS.

Report.—A small exhibit of fair calf russet fine stitched boots. Very fair workmanship, excellent material; proportions and style suitable to Russian markets.

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233. General Intendency of War, Russia.

ARMY BOOTS, AS ISSUED TO INFANTRY TROOPS.

Report.—This is a very excellently made and well-proportioned boot, which is made by machinery in the government workshops. It is made of a superior quality of russet Russia leather, cut full and high. The side seams are closed flat, with a double row of waxed stitching, the counters being well secured with an extra row of stitching. The soles are put on with a hand pegging machine, with a row of hand-stitching in the shanks as a security against ripping. In every way an excellent, substantial, and durable boot for the army.

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234. Imperial Maritime Customs, China.

SHOES.

Report.—The exhibit consists of a complete collection of the peculiar shoes of the country, deposited by the Imperial maritime customs of Shanghai, Amoy, Canton, Chefoo, Minchuang, and Chinkiang, and is interesting and instructive, as illustrating the tastes and customs of the people in this respect in the different parts of the empire.

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235. Henri Herth, Paris, France.

LADIES' AND GENTLEMEN'S FINE CUSTOM-MADE BOOTS, SHOES, AND GAITERS.

Report.—Fine exhibit of gentlemen's wear; officer's grain leather boot, reaching to lower part of thigh, and fastened under the knee by strap and buckle; enameled leather riding boot, with spurs; riding calf boot, jockey style; patent leather long boot, morocco legs, and very light soles, of superior workmanship; plain calf walking dress boots; also those having double and cork soles for winter; button gaiters, with drab cloth button, are made of one entire piece of leather, upon which the stitches can be seen, showing very fine workmanship. A pair of black silk-stocking gaiter boots, patent leather foxing, very tasteful; also a few pair of ladies' button walking gaiters. A very creditable exhibit.

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236. L. Huard, Paris, France.

GENTLEMEN'S AND LADIES' FINE HAND-MADE SHOES FOR CUSTOM TRADE.

Report.—Commended for great taste in combination of fine materials, and in ornamentation, as well as for skillful workmanship, combined with proper proportions to fit the foot.

The exhibit comprises a variety of styles and fine materials, such as patent leather, black kid, and fancy colored kid and satin, especially suited to Paris fine trade.

237. Louis S. Méliès, Paris, France.

GENTLEMEN'S AND LADIES' HAND-MADE BOOTS, SHOES, AND GAITERS, WHOLESALE FOR SOUTH AMERICAN AND FRENCH MARKETS.

Report.—A general variety of styles of men's riding, walking, and dress boots and gaiters; also women's riding and tongue patent leather boots, and fancy gaiters and slippers. Especially noteworthy for taste, style, and good proportions; material and workmanship good.

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238. Auguste Chapsal, Aurillac, France.

MEN'S BOOTS AND SHOES, HAND-MADE, NAILED, ETC.

Report.—Russia leather boots and shoes for Russian market; riding and fishing boots, hand-sewed and nailed. Commended as solid, substantial, and durable.

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239. Jeandron Ferry, Paris, France.

LADIES' HAND-MADE SHOES AND SLIPPERS FOR SPECIAL PARIS TRADE.

Report.—This exhibit comprises an assortment of various patterns, and fancy styles of shoes, made for a special Paris trade; such as stage shoes and slippers, ball and party shoes and slippers, and ladies' long riding boots. It evinces skill and taste, as also a very good degree of skilled workmanship in cutting, fitting, and bottoming.

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240. F. Pinet, Paris, France.

LADIES' AND MISSES' HAND-MADE SHOES AND SLIPPERS FOR WHOLESALE TRADE IN FRANCE, AND FOR EXPORTATION.

Report.—Commended for the extent, variety, and excellence of the exhibit, which is remarkable for the taste and skill displayed in the formation of the shoes, as well as in the ornamentation by embroidery and painting in oil, and by trimming, both with lace and flowers. The establishment embraces all grades, from the plain substantial kid shoe to the finest satin work.

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241. Grand Ducal Luxembourg Shoe Manufactory, Luxembourg, Grand Duchy of Luxembourg.

MEN'S HAND-SEWED AND SCREWED HIGH SHOES, ARMY BROGANS, SCREWED AND HEAVY MINERS' SHOES, HOB-NAILED AND VERY SUBSTANTIAL; HAND-STITCHED GAITERS.

Report.—The heavy work is of good substantial workmanship and materials. A few pair of ladies' hand-stitched gaiters are substantially made.

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242. G. Vandenbos-Poleman, Ghent, Belgium.

GENTLEMEN'S AND LADIES' HAND-MADE BOOTS, SHOES, AND GAITERS.

Report.—A very extensive exhibit of men's Russia leather riding and walking boots and shoes; fine calf-skin gaiters and shoes; also ladies' French kid button gaiters with cork soles; very excellent workmanship and material, and good proportions.

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243. Alph. Watrigant, Brussels, Belgium.

MEN'S AND LADIES' CUSTOM-MADE SHOES AND GAITERS.

Report.—Ladies' fine gaiters and slippers, which are especially noteworthy for taste and workmanship and good style; proportions excellent; gentlemen's gaiters and patent leather shoes are of excellent material, workmanship, and style.

244. **P. Astengo & Co., Caracas, Venezuela.**

GENTLEMEN'S BOOTS AND SHOES, AND LADIES' GAITERS.

Report.—A very extensive exhibit, consisting of gents' patent leather tongue and calf boots and shoes; Russia leather walking and hunting shoes; fine hand-made stitched and copper nail work; fine calf and cloth embroidered slippers; boys' and youths' boots and shoes; also ladies' fine kid, serge, and satin gaiters and fancy shoes; very superior workmanship and material; proportion and style excellent.

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245. **Esteban Ribox & Brothers, Granada, Spain.**

CAMP SHOES, WOVEN HEMP SOLE, FOR ARMY AND MOUNTAINEER PURPOSES.

Report.—An extensive exhibit of woven uppers and hemp soled shoes, intended for the army and peasant use in mountainous and hot sandy countries; very cheap, serviceable, and cool.

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246. **Francisco Chia y Ganga, Seville, Spain.**

LADIES' FINE KID AND SATIN GAITERS AND SLIPPERS.

Report.—A very handsome exhibit of fine ladies' custom fancy gaiters and slippers, superior in workmanship and material, with style to suit the Andalusian ladies.

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247. **Epifanio Ralero, Segovia, Spain.**

LADIES' FANCY LEATHER SLIPPERS.

Report.—A variety of figures cut with a very rude instrument, displaying great skill and ingenuity in ornamentation.

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248. **Antonio Diaz, Madrid, Spain.**

GENTLEMEN'S AND LADIES' FINE GAITERS AND SLIPPERS.

Report.—A very fine exhibit of ladies' fine satin and kid gaiters and slippers; workmanship and material very superior; also some very fine gentlemen's gaiters and walking shoes.

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249. **José Nogueira Soares, Penafiel, Portugal.**

MEN'S AND WOMEN'S WOOD-SOLED GAITERS.

Report.—A very nice article of men's and women's boots and gaiters with leather sole stitched on, and wood sole attached with joints for wet weather; suitable for home trade.

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250. **Felipe José Serra, Lisbon, Portugal.**

GENTS' AND LADIES' BOOTS, SHOES, AND SLIPPERS.

Report.—A good exhibit of gentlemen's gaiters and shoes, light and heavy work; also ladies' and children's gaiters and slippers; very excellent workmanship and material; style and proportions suitable to their own country.

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251. **Rodrigo Alves Martins Souto, Oporto, Portugal.**

LADIES' AND GENTLEMEN'S HAND-SEWED GAITERS AND SHOES.

Report.—A fair assortment of custom-made gentlemen's and ladies' gaiters and shoes; also button gaiters, etc. Commended for excellent workmanship and good material; proportions and style suitable for home trade.

252. Francisco Pinto Sequeira, Oporto, Portugal.

LADIES' AND GENTLEMEN'S CUSTOM-MADE BOOTS.

Report.—A small but good exhibit of gentlemen's and ladies' gaiters and shoes; workmanship and material good; proportions and style suitable to their own country.

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253. Germano de Almeida, Lisbon, Portugal.

GENTLEMEN'S AND LADIES' BOOTS AND SHOES.

Report.—A small exhibit of gentlemen's calf and kid gaiters; a few pairs of ladies' kid and satin gaiters; workmanship and material good; style and proportions suitable to their own country.

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254. Gomes & Son, Lisbon, Portugal.

GENTS', BOYS', AND LADIES' HAND-MADE BOOTS AND SHOES.

Report.—A small exhibit of gents' hand-stitched Congress patent leather, calf, kid, and cloth gaiters; ladies' button French kid, patent leather, grain, goat, pump, and cork sole gaiters; fine material and good workmanship; style suitable to Portugal.

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255. C. F. Cathiard, Rio de Janeiro, Brazil.

MACHINE-MADE BOOTS AND SHOES.

Report.—This is quite an extensive exhibit, made on French screw machine, embracing a variety of styles and qualities of work suited to South American market, and is notable for solidity and cheapness, and the amount of skill displayed in this industry, which is comparatively new in Brazil.

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256. H. Viguier, Rio de Janeiro, Brazil.

MEN'S AND BOYS' MACHINE-SEWED GAITERS.

Report.—A very fine exhibit of machine-sewed gaiters and shoes, of very excellent workmanship and material; the style and proportions very handsome.

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257. Argentine Republic.

SHOES AND LEATHER, HIDES AND SKINS.

Report.—This is a collective exhibit made by the Government through the Provincial Commissions of the provinces represented, as follows: boots from the province of Tucuman; boots, etc., from province of Cordova; boots from the province of Salta; leather from province of Rioja; leather from the province of Catamarca; leather from province of Tucuman; leather from province of Entre Rios; leather from province of Salta; leather from province of Jujui; also a collection of dry, salted, and flint-cured cow and steer hides, goat and sheep skins, and skins of the different animals of the country. The exhibit is intended to illustrate the resources of the country in hides and skins for export or home consumption; also the different animals of the country, and the condition and progress of the leather and shoe industry.

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258. I. Iramon, Santa Fé, Argentine Republic.

RIDING BOOTS.

Report.—Tap sole riding boots, enameled leather and calf vamps; well cut, good style, proportions, and work.

259. **Francis Barelli & Son, Santa Fé, Argentine Republic.**

RIDING BOOTS.

Report.—Commended for correct proportion, good style, and good work.

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260. **Lorenzo Buasso, Buenos Ayres, Argentine Republic.**

GENTLEMEN'S FINE SEWED BOOTS AND SHOES.

Report.—Taste in styles and proportions, and very good workmanship; a small exhibit; well cut, and very well made and finished.

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261. **Luigi de Notaris, Naples, Italy.**

GENTLEMEN'S AND LADIES' FINE HAND-MADE BOOTS AND SHOES; FINE CUSTOM-MADE RIDING BOOTS, BUTTON GAITERS, AND SHOES.

Report.—Workmanship and material excellent; well cut and made; style and proportions suitable for Italian market.

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262. **Antonio Moiraghi, Turin, Italy.**

GENTLEMEN'S HAND-MADE CUSTOM BOOTS AND SHOES.

Report.—Commended for excellent workmanship and material; of good proportions and style for home market.

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263. **Melchiorre Vinci, Palermo, Italy.**

GENTLEMEN'S HAND-SEWED BOOTS AND SHOES.

Report.—Very superior workmanship and material, consisting of riding and walking boots and shoes; also a very superior pair of leather breeches and boots, cut in one piece, very handsomely fitted; the work done in an artistic manner, and, as a whole, a very ingenious piece of work.

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264. **I. Skoraczewski, Posen, Germany.**

MEN'S AND BOYS' HEAVY SEWED GRAIN BOOTS.

Report.—The exhibit consists of a pair of high military boots with spurs, fur lined, six thicknesses of leather in sole; one pair hunting boots, one pair lace boots without seam, one pair galoshes without seam, one pair boys' boots cut without seam. This exhibit is commended for the skill and novelty of cutting boot leg and shoe without a seam, and as good, solid, substantial work.

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265. **S. Wolf, Mentz, Germany.**

GENTLEMEN'S AND LADIES' HAND-MADE FINE BOOTS, SHOES, AND GAITERS.

Report.—Commended for very excellent workmanship and material, in style and proportions to suit the Australian and German market, at very reasonable prices; consisting of grain leather hunting shoes, with seam at side only; patent leather and calf gaiters, slippers, and Oxford ties; ladies' kid and serge gaiters. Superior exhibit of hand-made work.

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266. **Adolph B. Löwenstein, Vienna, Austria.**

LADIES' HAND-MADE SHOES AND SLIPPERS FOR EXPORTATION.

Report.—A very extensive and handsome exhibit of low shoes and slippers, with thin soles, made of goat, sheep, and stuff, turn-rounds, trimmings elaborate, with bows; some samples of gentlemen's toilet slippers and wearing shoes of good proportions. Workmanship fair. Supplied for exportation at very low prices.

267. **H. S. Naes, Christiania, Norway.**

MEN'S AND WOMEN'S HAND-MADE BOOTS AND SHOES.

Report.—They are substantially made of good materials; in styles and proportions suited to their own market.

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268. **P. N. Nordahl, Christiansand, Norway.**

MEN'S AND WOMEN'S HAND-MADE BOOTS AND SHOES.

Report.—The materials and workmanship are good, and the exhibit comprises a variety in men's long and riding boots, of styles suitable for home market.

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269. **O. Tornberg, Goteberg, Sweden.**

GENTLEMEN'S BOOTS, SHOES, AND GAITERS.

Report.—A very fine exhibit of custom-made work, consisting of patent leather tongue boots with morocco legs, patent leather strap shoes, double inseam cork sole gaiter, with enameled facing, of very superior workmanship and materials. Style and proportions excellent.

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270. **C. E. Sranberg, Jönköping, Sweden.**

MEN'S AND WOMEN'S BOOTS AND SHOES FOR WHOLESALE.

Report.—An exhibit of hand-made men's riding, jockey, and light walking boots, terraced bottom, with double inseam cork soles, and plain gaiters; also ladies' satin and French kid gaiters of good, fair workmanship and materials. Style and proportions suitable to Sweden.

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271. **José Maria Astudillo, Santiago, Chili.**

LADIES' AND GENTLEMEN'S FINE HAND-MADE BOOTS AND GAITERS.

Report.—A small exhibit of gentlemen's enameled leather riding boots, patent leather gaiters, ladies' satin and patent leather gaiters, of excellent workmanship and material; the proportions and style suitable for Chili.

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272. **José Says, Barcelona, Spain.**

GENTLEMEN'S CUSTOM BOOTS AND SHOES, HUNTING AND RIDING BOOTS, DOUBLE INSEAM, CORK SOLES, AND OVERSHOES.

Report.—The workmanship and materials are good and substantial; the proportions and style are suitable for Spanish market.

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273. **Gordon McKay, Boston, Mass., U. S.**

MCKAY TACKING MACHINE, FOR TACKING THE OUTSOLE TO THE LASTED SHOE TO HOLD IT WHILE BEING SEWED, NAILED, OR PEGGED.

Report.—This machine drives a light-headed tack with a clinching point. The point is clinched down close in the leather, leaving the insole smooth and free from anything to hurt the foot. The headed nail, thus clinched, holds the sole firmly to its place, and requires a less number to hold it, and thus requires less time in the operation.

274. McKay Sewing-Machine Association, Boston, Mass., U. S.

WIRE RIVETING MACHINE FOR UNITING THE SOLES TO THE UPPERS OF BOOTS AND SHOES.

Report.—This machine uses an oval corrugated wire, which it cuts with a level clinching point, automatically grading the length of the wire cut to the length required. The machine works rapidly, clinches the nail on the insole, doing very solid, substantial work. Is specially adapted to heavy work.

275. David Knox, Lynn, Mass., U. S.

A GLAZING AND PEBBLING MACHINE FOR MOROCCO AND SHEEP-SKINS; A SOLE-CUTTING MACHINE.

Report.—The glazing machine, being made entirely of iron, is very solid and substantially built; compact, occupying but little space; is adjustable in all its parts; runs lightly and rapidly, with but slight stress on binding; makes a straight stroke, and does excellent work. The sole-cutting machine is well and substantially built. It cuts all sizes of soles out of all qualities of stock, cutting the stock dry, so that those grades not wanted for immediate use can be laid away without damage. It is simple and efficient.

276. J. G. Buzzell & Co., Lynn, Mass., U. S.

SAND-PAPERING MACHINE; HEEL-SCOURING MACHINE; MONOGRAM MACHINE; HEEL-BREASTING MACHINE; A FRICTION DEVICE FOR RUNNING SEWING MACHINES BY POWER.

Report.—The sand-papering machine for finishing the bottoms of boots and shoes is commended for the superiority of the patent clamp roll, and the facility with which the sand-paper can be attached to or detached from the same, and for the thoroughness with which it carries off all dust made in running it. The device for running sewing machines by power is the most simple, sensitive, and efficient we have seen. It avoids all friction and end motion. The other machines are merely commended for their simplicity and adaptation for the uses for which they are intended.

277. Geo. W. Baker, Wilmington, Del., U. S.

A SEWING MACHINE FOR SEWING WET GOAT AND SHEEP SKINS PREPARATORY TO TANNING.

Report.—Commended for the simplicity of its mechanism, and substantial construction. All parts are worked by one shaft, without gears. It is positive in its motions, and not liable to get out of order. It runs lightly and very rapidly, and all parts subject to the wear of the thread are so arranged as to be easily and cheaply replaced.

278. The S. W. Jamison Boot and Shoe Crimping Machine Co., New York, N. Y., U. S.

A MACHINE FOR CRIMPING BOOTS AND SHOES BY POWER.

Report.—This is a very ingenious and well-built machine, doing its work in a very superior manner, at a great saving of time and labor, and working with equal facility on all grades of stock, from fine morocco or French calf-skin to heavy split or wax upper.

279. Estabrook, Wires, & Co., Milford, Mass., U. S.

CLINCHING SCREW FOR FASTENING ON THE SOLES OF BOOTS AND SHOES.

Report.—Commended—1. For its simplicity. Any shoemaker can apply it without the aid of machinery.

2. For the solidity, durability, and elasticity of the work done with it. By the formation of the screw, the hole made in driving is smaller at the inside than at the outside

of the sole; and this, with the thread into which the leather settles firmly, prevents the screw from working through to hurt the foot.

The point of the screw, clinching on the inside, under the stroke of the hammer, draws the different layers of leather firmly together, effectually preventing the entrance of sand or water.

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280. **Tapley Heel-Burnishing Machine Association, Boston, Mass., U. S.**

A MACHINE FOR BURNISHING THE HEELS OF BOOTS AND SHOES.

Report.—This machine is a combination of a reciprocating burnishing tool with a mechanism for holding and grinding the boot or shoe against the action of such tool, thereby burnishing or finishing the heel in a superior manner and with a great saving of time and cost.

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281. **Union Edge Setter Co., Boston, Mass., U. S.**

A MACHINE FOR SETTING OR BURNISHING THE EDGES OF SHOES.

Report.—Commended for its simplicity, and the thorough permanent manner in which it does its work, and the rapidity with which it does it, effecting a great saving of labor.

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282. **Hanan & Dewes, New York, N. Y., U. S.**

CUTTERS OR DIES FOR CUTTING LEATHER, INDIA-RUBBER, PAPER, AND TEXTILE FABRICS, BY HAND OR MACHINERY.

Report.—Commended for the superior skill displayed in forging and finishing dies of very intricate and difficult designs. Would specially mention their patent detachable die-handle, which is considered meritorious for its strength, economy, and convenience.

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283. **McKay Sewing-Machine Association, Boston, Mass., U. S.**

A SEWING MACHINE FOR SEWING THE SOLES TO THE UPPERS OF BOOTS AND SHOES.

Report.—This machine is very ingeniously constructed, and sews the soles on boots or shoes with one seam, doing its work very rapidly and in a very superior manner, and working equally well on all classes of work, from the finest and lightest ladies' shoes to women's and men's heavy calf and split leather boots and shoes. Commended for the rapidity and excellence of its work, and the consequent reduction in the cost of the product, and its adaptation to all classes of work.

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284. **Tayman Shoe Machine Co., Philadelphia, Pa., U. S.**

A MACHINE FOR TRIMMING THE EDGES OF SOLES OF BOOTS AND SHOES; A MACHINE FOR SETTING OR BURNISHING THE EDGES OF SOLES OF BOOTS AND SHOES.

Report.—The edge-trimming machine is ingenious yet simple in its mechanism, and rapid and effective in operation. It can be operated by a boy or girl. While it effects a great saving in the cost of the work, in quality it is quite equal, if not superior, to work done by hand. The edge-setter is of similar general mechanism to the trimmer, and is very rapid in operation.

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285. **George C. Walters, Philadelphia, Pa., U. S.**

A MACHINE FOR SEWING WET GOAT AND SHEEP SKINS.

Report.—Commended for the simplicity of the mechanism and the substantial manner in which it is built. It does its work rapidly and economically.

286. Bronx Wool and Leather Co., New York, N. Y., U. S.

LAMB AND SHEEP AND GOAT SKINS.

Report.—Commended for the variety, evenness, and clearness of the colors in the different styles of finish, and for excellence of manufacture in their lamb and sheep skins for shoes and skivers for shoes and pocket books, and their goat-skins for books and upholstery, and bat wings and India sheep for pocket books.

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287. J. Barton Smith & Co., Philadelphia, Pa., U. S.

RASPS AND FILES FOR SHOEMAKERS' USE.

Report.—This exhibit comprises a complete line of all sizes and styles of rasps and files used by shoemakers, and is notable for the regularity, evenness, and excellence in the cutting, and adaptation to all the wants of the trade.

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288. Cutlan Shoe-Sewing Machine Co., Philadelphia, Pa., U. S.

A MACHINE FOR SEWING A TURNED SHOE.

Report.—This machine sews a good firm seam, and imbeds the chain stitch in the channel of the sole, which we think is a great advantage, as the chain stitch comes under the foot (covered by channel) instead of against the upper. We had light and medium edges sewed and finished up. We consider it an excellent machine for turn shoes.

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289. W. E. Plummer, Boston, Mass., U. S.

ROTARY TAN PRESS.

Report.—Commended as a skillful invention, useful in the preparation of tan for fuel.

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290. Estabrook, Wires, & Co., Milford, Mass., U. S.

HOW'S PATENT BOOT AND SHOE TREES.

Report.—They are simple and effective. The mechanism being simple and positive, they are not liable to get out of order. They stretch and fill all parts of the boot or shoe thoroughly and simultaneously. Being mounted on a table with a swivel, all parts of the boot or shoe are brought convenient to the operator; and by the peculiarity of their construction they can be easily and quickly inserted or detached from the boot or shoe without defacing it, after the treeing is completed. They are adapted to all grades of work, coarse or fine.

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291. L. S. Graves, Rochester, N. Y., U. S.

TEN SEPARATE AND DISTINCT PIECES OF MACHINERY FOR SHOE MANUFACTURERS.

Report.—No. 1. Stripping machine for cutting sides of leather in strips; cuts the heaviest stock dry. Simple, but a very useful machine.

No. 2. Splitting machine for splitting strips, with improved roll adjustment and friction drive and brake, steel rolls. An excellent machine, being strong and simply constructed.

Nos. 3 and 4. Rolling machines 24 and 31 inches, with friction and sudden stop, which is difficult to do when a balance-wheel is used, with a wide-hinged treadle, improved spring, running with but little noise. They are very good machines, strong and simple in their construction.

Nos. 5 and 6. Foot and power sole cutting machines (rolling die cutter). They are very useful and excellent machines.

No. 7. Beam sole cutting-machine, improved head adjustment, running noiselessly. We had neither material nor space to test the speed of the machine. We consider this a very

valuable machine for extensive manufacturers, enabling them to cut the sole across the stretch of hide and avoid loss in stripping from leather.

No. 8. Sole moulding machine, with improved double motion and top adjuster, solid bottom casting, four uprights (instead of two). A simple and well-built machine.

No. 9. Screw heel press. It is simply made with planed surfaces, is strongly built, powerful and useful.

No. 10. Sand-paper and buffing machine, with improved expanding roll, with elastic cushion; runs very smoothly and quietly, with strong frame swivel boxes or bearings, capped blower, and steel shafts.

The above machines are built strong and substantial and in a workmanlike manner, and are all taken from his stock. They are not gotten up for this Exhibition. In consequence of space being limited, and want of material, we have not been able to make as thorough a test of working powers of machines as they desired, but feel no hesitancy in pronouncing it an excellent exhibit.

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292. John K. Gittens, Brooklyn, N. Y., U. S.

CORK AND WOOL INSOLES.

Report.—Cork inner soles commended as a protection from dampness and a great comfort to those suffering from cold feet. They are well made, of the best cork, and are a good article. Polar soles commended as being peculiarly adapted to making a warm, easy shoe for invalids or aged persons for in-door use.

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293. Wm. Dreisbach & Co., Philadelphia, Pa., U. S.

SHOE BOWS AND ROSETTES, FOR TRIMMING SHOES AND SLIPPERS.

Report.—The exhibit comprises a large variety of styles of bows of white, gold, silver, bronze, and black kid, satins, etc., and evinces great skill and taste, both in the designs and the combinations of materials, colors, and ornamentation.

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294. Jenkins Brothers & Co., South Abington, Mass., U. S.

STEEL SHOE SHANKS.

Report.—Commended for their superiority of manufacture and temper, and for the variety of sizes and styles suited for the different grades of work.

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295. The Tubular Rivet Co., Boston, Mass., U. S.

A TUBULAR RIVET, AND MACHINE FOR SETTING SAME.

Report.—By the formation of the rivet it punches its own way through the material, and, being riveted by the machine without the use of a burr, it does its work very rapidly; forms a neat, strong fastening; and, as the machine can be operated by a boy or girl, it is a very rapid and cheap mode of fastening for brogans, shoes, and leather work.

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296. Henry J. Pratt, Abington, Mass., U. S.

PATENT LAST-BLOCK FASTENER.

Report.—Commended as an effectual device for fastening the last-block to the last while the shoe is being made upon it, holding them firmly together, being readily fastened and unfastened, and avoiding the danger of splitting the last-block by tacking.

297. E. B. Stimpson, New York, N. Y., U. S.

SHOE MACHINERY.

Report.—This exhibit consists of punching machine, for ornamenting boots and shoes; wrinkling and cording machine, for boots and shoes; leather-folding machine, for vamps, button-flies, etc.; leather-skiving machine, for fancy vamps of boots and shoes; seam-rubbing machine, with changeable form, for boots and shoes; double-acting arm and platform sewing machine, for shoe and pocket-book work; four-action sewing machines, for shoe work. Commended for ingenuity of construction and adaptation to the uses for which they are intended.

---

298. Thos. R. Evans, Philadelphia, Pa., U. S.

BOOT AND SHOE TREES; ALSO STRETCHERS.

Report.—The exhibit comprises a revolving indexical boot-tree, with stretchers for instep and toes, very simple in construction and effectual in working, placing the boot in handy position for the workman to finish; also a shoe-tree on same principle, displaying considerable ingenuity in construction.

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299. The National Boot & Shoe Tip Co., Boston, Mass., U. S.

COLORED RAW HIDE BOOT AND SHOE TIP.

Report.—Is an excellent protection for the toes of boots and shoes, and is especially adapted to children's wear. The material is durable and flexible, and, being colored through, will retain its color and not detract materially from the appearance of the shoe.

---

300. J. E. Mitchell, Philadelphia, Pa., U. S.

RUB STONES, CLEARING STONES, AND SCOURING STONES.

Report.—The exhibit comprises a large and complete line of all the best grades of foreign and domestic rub and clearing stones and scouring stones, slates, and glass, for hand and machine use, cut and finished by machinery, in a very superior manner.

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301. Elias P. Newton, Gloversville, N. Y., U. S.

GLOVE AND MITTEN CUTTING, AND DIE AND LEATHER CUTTING BLOCK.

Report.—Commended for a very ingenious and skillfully made instrument, and well adapted to its purpose, resulting in great economy of material.

---

302. Swain, Fuller, & Co., Lynn, Mass., U. S.

SHOE MACHINERY.

Report.—1st. A sole-moulding machine, for moulding the soles of shoes, rendering them solid and properly shaped to prepare for the last. A strong, well-built, useful machine. 2d. A beating-out machine, for leveling the soles of shoes to the form of the last after they are sewed or pegged, enabling it to receive an even and uniform finish. Is a well-made and valuable machine. 3d. Sand-papering or buffing machine, for soles of boots and shoes. It is very simple in construction, runs rapidly and steadily, requiring but little power to drive it, and is very efficient in its operation.

303. D. Whittemore, Boston, Mass., U. S.

SHOE MACHINERY.

Report.—1st. The Thompson edge-trimming and edge-setting machines. These machines are very simple in construction, the chief merit being the rapidity and the consequent economy of their working, but are specially adapted to coarse, heavy work.

2d. The Star Splitting Machine, of different sizes, adapted to splitting sole and upper leather to any desired thickness. The most noticeable feature is the vibrating motion of the upper roll, giving the leather a drawing motion on the splitting knife, cutting easily and smoothly, working well on smooth, solid stock.

3d. Beam sole leather cutter, for dieing out soles from the whole side. This machine is solidly and strongly built, and has a patent hollow pulley and clutch and brake for starting and stopping the machine instantly at any point; but, the machine not being put into operation, we cannot speak of its special or comparative merits.

The different pegging machines, and the alligator and other wax thread and loop stitch sewing machines, manufactured and exhibited by this exhibitor, not being shown in operation, we can only judge of them on their general reputation, which is good. They do good, solid work.

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304. McKay Lasting-Machine Association, Boston, Mass., U. S.

A MACHINE FOR LASTING BOOTS AND SHOES; A HAND-TACKING MACHINE FOR TACKING THE UPPERS TO INSOLES OF SHOES.

Report.—Commended for simplicity and proper adaptation to the purposes for which they are intended. The lasting machine, by drawing uniformly all parts of the upper, works more uniformly satisfactorily than that done by hand, and, by the use of the hand-tacker in connection with it, makes a great saving in time, and consequently in cost, especially in grain leather, or other heavy grades of work.

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305. The American Cable Screw Wire Co., Boston, Mass., U. S.

STANDARD SCREW WIRE MACHINE FOR UNITING THE SOLES TO THE UPPERS OF BOOTS AND SHOES.

Report.—A well-constructed and efficient machine for the purpose intended. By the pressure obtained from the presser foot holding the inner and outer sole solidly together, and the screw being screwed into the leather, the sole and upper are united very closely and substantially and thus held firmly by the thread of the screw. It is specially adapted for heavy work.

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306. McKay & Bigelow Heeling-Machine Association, Boston, Mass., U. S.

A HEEL-COMPRESSING MACHINE; A HEEL ATTACHING AND TRIMMING MACHINE.

Report.—These two machines, which are to be used in conjunction, are ingeniously constructed, and admirably adapted to the uses for which they are intended. Their merits are rapidity of work and consequent economy, and the superiority of the work done by them. The first compresses the heel very solidly, so that it is not liable to crack open, and inserts the nails, ready to be driven by the second, which at one motion drives all the nails, attaching the heel solidly to the shoe, and at another motion trims or shapes the heel smoothly, ready for burnishing.

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307. The American Shoe-Tip Co., Boston, Mass., U. S.

PROTECTION FOR THE TOES OF BOOTS AND SHOES.

Report.—This protection is especially designed for children's and ladies' fine shoes; is an effectual protection to the toe of the shoe, as the sole extends beyond and over the upper slightly, and prevents its wearing through at that point, and does not detract in any degree from the appearance of the finest work.

308. **Marcus Hanan, New York, N. Y., U. S.**

ZINC AND BRASS EDGED SHOE PATTERNS, PAPER SHOE PATTERNS, AND STAMPS FOR MARKING FOR FANCY STITCHING.

Report.—Shoe patterns commended for durability and substantial construction, and for proper proportions and correct grading of sizes. Stamps commended for variety and taste of designs.

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309. **Graves, Ball, & Co., Albany, N. Y., U. S.**

SHOE LASTS AND INNER AND OUTER SOLE PATTERNS.

Report.—Commended for accuracy of grading in sole patterns, and uniformity in grade, proper proportion, and style in lasts; also for superior workmanship in finishing and fitting the iron bottoms to the lasts.

---

310. **Hautin Sewing Machine Co., New York, N. Y., U. S.**

A WAX THREAD LOCK STITCH SEWING MACHINE FOR HARNESS AND LEATHER WORK.

Report.—Commended for ingenuity and simplicity of mechanism, and for rapidity and excellence of work, making a lock stitch similar to hand-work, alike on both sides.

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311. **Wm. H. Horn & Brother, Philadelphia, Pa., U. S.**

SHOEMAKERS', TANNERS', AND CURRIERS' TOOLS.

Report.—It is a very extensive and excellent exhibit, evincing superior workmanship in the construction, tempering, grinding, and finishing. Commended for the direct adaptability of the different tools to the various uses for which they are intended.

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312. **McLaughlin, Grover, & Loyd, New York, N. Y., and Philadelphia, Pa., U. S.**

DIES FOR LEATHER, PAPER, AND CLOTH, LEATHER SPLITTING, AND MACHINE KNIVES.

Report.—A very superior exhibit of dies for shoe manufacturers, knives for bookbinders, and planing machines; dies for envelopes, of very superior quality and workmanship. A very creditable exhibit.

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313. **James Wensley, Philadelphia, Pa., U. S.**

CHILDREN'S FANCY AND PLAIN MOROCCO AND SERGE SHOE UPPERS.

Report.—Commended for excellence of button-hole working, done by an improvement of his own, on the Union button-hole machine, on French kid, serge, and other light materials, and displaying superior workmanship.

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314. **Wm. Butterfield & Co., New York, N. Y., U. S.**

ANCHOR BUTTON FASTENER FOR ATTACHING BUTTONS TO SHOES.

Report.—Commended for the facility with which it can be attached to the shoe; for the strength of the attachment, and the facility with which it can be taken off when it is desirable to move the button; also for the fact that buttons so fastened on yield to the button-hook, and are therefore not liable to hurt the foot in buttoning.

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315. **Simon S. Redifer, Philadelphia, Pa., U. S.**

MEN'S AND WOMEN'S, MISSES' AND CHILDREN'S LASTS OR FORMS FOR SHOES.

Report.—An excellent exhibit of shoe lasts, of superior shapes, grade, and finish; wood prime; also graded patterns for soles, full set for lasts; well-adjusted iron on bottom for machine screw and nail work; very superior finish, and a creditable exhibit.

316. **Eugene Creed, New York, N. Y., U. S.**

MEN'S BOOT AND SHOE UPPERS.

Report.—A good exhibit of men's boot and shoe uppers; well cut and finished; excellent material for custom work.

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317. **Dawley & Derby, New York, N. Y., U. S.**

LASTS, BOOT TREES, CRIMPING BOARDS, AND STRETCHERS.

Report.—A fair exhibit of lasts, boot trees, turned and finished by machinery, good seasoned wood, fair forms and shapes, low price.

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318. **John Targett, Philadelphia, Pa., U. S.**

BOOT, SHOE, AND GAITER PATTERNS.

Report.—Commended for correctness in grading and proportions; special mention of Oxford tie upper, cut without seam, crimped on last, evincing skill and ingenuity.

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319. **Israel G. Sutherland, Lynn, Mass., U. S.**

BOOT AND SHOE PATTERNS IN BRASS EDGE AND ZINC.

Report.—An exhibit of heavy paper with brass edge and zinc patterns; very correct in grade and workmanship.

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320. **J. B. Stoll & Co., Louisville, Ky., U. S.**

SADDLE SKIRTING, OAK-TANNED.

Report.—Commended for high skill and workmanship in the manufacture and finish of the leather.

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321. **Laurens E. de Waru, Philadelphia, Pa., U. S.**

A PATENT SEAM FOR THE BACKS OF SHOES, KNOWN AS THE GORDIAN SEAM.

Report.—This seam being formed by sewing the seam and covering the same with a stay piece, fastened in such a manner that the stitches are not exposed; firm and effectually stayed seam, which is durable, not being liable to rip from the wearing off of the stitches.

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322. **McNeely & Co., Philadelphia, Pa., U. S.**

TAMPICO MOROCCO, RED, BLUE, ROSE, PEARL, AND CUIR, FOR SHOES.

Report.—Commended for the delicacy, evenness, and clearness of the colors, and for excellence of finish.

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323. **Hamilton Web Co., Wickford, R. I., U. S.**

BOOT, GAITER, AND STAY WEBS AND BINDINGS.

Report.—Commended for durability and strength, with excellence and smoothness of finish and evenness of edges. These goods, which are exhibited in great variety of styles and widths, to suit the varied wants of the trade, evince taste and skill, and the use of the most improved appliances in their manufacture.

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324. **Abram Hewling, Philadelphia, Pa., U. S.**

PATENT ICE-CREEPER.

Report.—It is strong and substantially made, easily attached to the shoe, and, being hinged, can be folded back out of the way when entering the house or when not in use. An excellent appliance for the purpose.

325. **A. F. Stowe, Worcester, Mass., U. S.**

SOLE LEATHER SPLITTING MACHINE, UPPER LEATHER SPLITTING MACHINE, MACHINE FOR ROLLING LEATHER, WELT CUTTING MACHINE, STRAP CUTTING MACHINE.

Report.—The splitting machines are well and substantially built, and, by the application of a third or feed roll, the bellies and wrinkled and flabby parts of a side can be passed through and split without gouging or damaging, which peculiarity adapts these machines for working the rough and poorer grades of leather. The rolling machine has the third roll, which answers the same purpose in rolling as in splitting. It has, besides, a superior method of adding to or decreasing the pressure at the will of the operator, thereby doing away with the old foot lever. All of these machines are well and substantially built, and adapted to the purposes for which they are designed.

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326. **J. Bithencourt, Rio de Janeiro, Brazil.**

LASTS OR FORMS FOR MEN'S, WOMEN'S, AND CHILDREN'S SHOES.

Report.—Commended for good proportions, and shaped to fit the foot; the style is excellent; the wood is of very fine grain, and well seasoned.

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327. **Giovanni Baldi, Florence, Italy.**

MEN'S BOOT TREES; LASTS OR FORMED STRETCHERS.

Report.—A very excellent exhibit of boot trees and forms, handsomely finished and of excellent shapes; also stretchers for instep or toes, which are very ingeniously made.

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328. **S. Efimof, St. Petersburg, Russia.**

CALF (FAIR) BOOT AND SHOE FRONTS.

Report.—A very fine exhibit of Russia calf (fair) boot and gaiter fronts; tannage and color good; flesh smooth and fair, and grain tough and fine.

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329. **Rudolph Huebner, St. Petersburg, Russia.**

CALF BOOT AND GAITER FRONTS.

Report.—A very fine article of crimped boot and gaiter fronts; fair and very fine in flesh; grain very fair and tough; tannage very superior.

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330. **Alexander Emilianof, St. Petersburg, Russia.**

CRIMPED BOOT AND GAITER FRONTS.

Report.—A good exhibit of calf crimped boot and gaiter fronts; very fine and fair flesh; a very beautiful grain, and very tough, with superior tannage.

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331. **Broosnetzyn & Sons, St. Petersburg, Russia.**

CALF AND HORSE-HIDE CRIMPED BOOT FRONTS AND SOLE LEATHER.

Report.—Horse-hide crimped boot fronts, black and very superior, fine grain, and excellent tannage; also fair crimped calf boot fronts, very fine flesh, grain very fine and beautiful; tannage very superior. As a whole, a very fine exhibit.

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332. **Frederick Lang, St. Petersburg, Russia.**

CALF (FAIR) CRIMPED BOOT AND GAITER FRONTS.

Report.—A very fine exhibit of Russia calf russet crimped boot and gaiter fronts; well tanned, with fine, soft, beautiful flesh, and very tough, handsome grain; superior stock.

333. Modeste Kittary, St. Petersburg, Russia.

A MAP OF THE LEATHER INDUSTRY OF RUSSIA.

Report.—A work evincing much industry and research in regard to the leather industry of Russia. In addition to compiling a vast amount of valuable statistics in regard to the leather industry, Professor Kittary has so arranged this map as to illustrate and show at a glance the extent of the leather industry in any particular section, and its comparative extent and importance in the different sections. It is a work of special interest and value to all interested in this great industry.

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334. Antonio Diaz, Malaga, Spain.

ANDALUSIAN BRIDLES AND SADDLERY.

Report.—A very superior exhibit of this class of work, combining good workmanship in the construction, with very handsome and elaborate ornamentation in embroidery, in a style suited to the taste of Andalusia.

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335. José Rodriguez Zurdo, Madrid, Spain.

LADIES' RIDING BRIDLES AND SADDLES.

Report.—A most superior exhibit of taste, skill, and substantial workmanship, while the exhibit is very handsomely ornamented with raised figures in the leather, and handsome and artistic stitching. It combines with these excellent proportions solidity, and grace of general outline. A very superior exhibit.

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336. H. W. Hofmann, St. Petersburg, Russia.

TRUNKS, PORTMANTEAUS, AND SATCHELS.

Report.—This is an extensive and excellent exhibit, comprising solid sole leather trunk, with round corners, without joints at corners, notable for strength and serviceableness and excellence of finish; also an assortment of solid leather portmanteaus, grain and Russia leather, bellows-top portmanteaus, Russia leather and morocco traveling satchels, writing desks, cabas, and portfolios, which are notable for variety of styles and ingenuity of construction and for the taste and excellence of finish and ornamentation.

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337. Greenwood & Batley, Leeds, England.

WAX THREAD LOCK STITCH SEWING MACHINE FOR LEATHER WORK.

Report.—This is a sewing machine driven by power, making a lock stitch with wax thread, using two threads and working with a shuttle over the work. It is adapted for sewing the soles on boots and shoes, sewing through the outer and inner soles, or sewing the outer sole to a welt; also for sewing harness, siding up heavy boots, and for leather work generally. Its peculiar merits are the combination of a shuttle and a hook for catching and opening the loop, enabling it to use thread well waxed with ordinary shoemaker's wax; also the presser foot, which holds the leather firmly together, obviating the great strain on the needle and thread in drawing the leather together in sewing, and the general excellence and solidity of its construction.

SIGNING JUDGES OF GROUP XII.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

JOHN CUMMINGS, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 89, 96, 97, 98, 99, 101, 102, 107, 109, 113, 114, 116, 117, 123, 124, 132, 136, 137, 138, 139, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 163, 164, 165, 166, 167, 168, 169, 170, 172, 257, 289, 301, 320.

J. P. POSTLES, 31, 72, 73, 90, 91, 92, 93, 94, 103, 104, 105, 106, 115, 118, 119, 122, 125, 126, 127, 128, 129, 130, 131, 133, 140, 142, 143, 155, 156, 157, 158, 159, 171, 194, 205, 209, 210, 211, 226, 228, 230, 232, 234, 242, 249, 250, 251, 252, 253, 264, 282, 286, 292, 293, 294, 299, 300, 307, 308, 309, 312, 313, 315, 316, 317, 318, 322, 328, 331, 332, 333, 334, 335, 337.

THOMAS MILES, 88, 95, 100, 108, 110, 111, 112, 120, 121, 134, 135, 141, 160, 161, 162, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 206, 207, 208, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 227, 229, 231, 233, 235, 236, 237, 238, 239, 240, 241, 243, 244, 245, 246, 247, 248, 254, 255, 256, 258, 259, 260, 261, 262, 263, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 283, 284, 285, 287, 288, 290, 291, 295, 296, 297, 298, 302, 303, 304, 305, 306, 310, 311, 314, 319, 321, 323, 324, 325, 326, 327, 329, 330, 336.

SUPPLEMENT TO GROUP XII.

REPORTS

OF

JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.
COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

1. Goodyear & McKay Sewing Machine Association, Boston, Mass., U. S.

NO. 1. A MACHINE FOR SEWING WELTS OR INSEAMS FOR WELTED WORK.
NO. 2. A MACHINE FOR SEWING OUTSOLES TO WELTS AS HAND MADE-WORK.

Report.—Commended for ingenuity and skill in mechanism. The only machines adapted to sewing on a welt and sewing welt to outsole as hand-made work. No. 1 machine is also adapted to sewing twine around shoes, using a curved needle; will sew on an ordinary last, thin and medium edge. Sewing firm; good, substantial, springy work.

2. P. J. Rentzel, New York, N. Y., U. S.

BOOT, SHOE, AND GAITER UPPERS.

Report.—A exhibit of men's riding enameled leather, calf vamps, maroon, goat, and patent leather vamp, and plain boot legs, button and Congress gaiters, short quarter shoes, etc. Machine stitching and fitting very satisfactory; material and proportions good.

3. C. M. Henderson & Co., Chicago, Ill., U. S.

BOOTS AND SHOES.

Report.—Good substantial work, and well adapted to the purpose intended.

4. Fred. A. Lockwood, Fall River, Mass., U. S.

AUTOMATIC LEATHER SCOURER.

Report.—Commended for originality, fitness for the purpose intended, and progress as a labor-saving machine.

5. J. E. Fisk, Salem, Mass., U. S.

WHITENING AND BUFFING MACHINE.

Report.—Commended for progress as a labor-saving machine, to supersede hand-labor.

6. **Wm. T. Dixon & Brother, Baltimore, Md., U. S.**

BOOTS AND SHOES.

Report.—Good substantial work, suitable for the wholesale trade.

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7. **Merino Shoe Co., Davis, Whitcomb & Co., Boston, Mass., U. S.**

CLOTH SHOES.

Report.—Commended for economy in cost, and as being well adapted to the intended purpose,—of keeping the feet warm.

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8. **W. E. Plummer, Boston, Mass., U. S.**

WHITENING AND BUFFING MACHINE.

Report.—This machine is intended to supersede hand-labor. It produces good work, and is a forward step in progress.

SIGNING JUDGE OF SUPPLEMENT TO GROUP XII.

The figures annexed to the name of the Judge indicate the reports written by him.

SPENCER F. BAIRD, 1, 2, 3, 4, 5, 6, 7, 8.

United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP XIII.

EDITED BY
FRANCIS A. WALKER,
CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1877.

Entered, according to Act of Congress, in the year 1876, by the
CENTENNIAL BOARD OF FINANCE,
In the Office of the Librarian of Congress at Washington.

SYSTEM OF AWARDS.

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

* * * * * * * * * * *

Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respectively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP XIII.

JUDGES.

AMERICAN.

JAMES M. WILLCOX, Philadelphia, Pa.

C. O. CHAPIN, Springfield, Mass.

WM. FAXON, Hartford, Conn.

EDWARD CONLEY, Cincinnati, Ohio.

H. T. BRIAN, Washington, D. C.

FOREIGN.

SYDNEY H. WATERLOW, Bart., M.P., Great Britain.

G. W. SEITZ, Wandsbeck, near Hamburg, Germany.

GROUP XIII.

PAPER INDUSTRY, STATIONERY, PRINTING, AND BOOK-MAKING.

CLASS 258.—Stationery for the desk, stationers' articles, pens, pencils, inkstands, and other apparatus of writing and drawing.

CLASS 259.—Writing paper and envelopes, blank-book paper, bond paper, tracing paper, drawing paper, tracing linen, tissue paper, etc., etc.

CLASS 260.—Printing papers for books, newspapers, etc.

Wrapping paper of all grades; cartridge and manila paper; paper bags.

CLASS 261.—Blank books, sets of account books, specimens of ruling and binding, including blanks, bill heads, etc.; book-binding.

CLASS 262.—Cards,—playing cards, cardboard, binders' board, pasteboard, paper or cardboard boxes.

CLASS 263.—Building paper, pasteboard for walls, cane fibre felt, papier maché, and material for construction, car wheels, ornaments, etc.

CLASS 264.—Wall papers, enameled and colored papers, imitations of leather, wood, etc.

MACHINES AND APPARATUS FOR TYPE-SETTING, PRINTING, STAMPING, EMBOSSING, AND FOR MAKING BOOKS AND PAPER WORKING.

CLASS 540.—Printing presses.

CLASS 541.—Type-casting machines, apparatus of stereotyping.

CLASS 542.—Types, and type-setting machines. Type-writing machines.

CLASS 543.—Printers' furniture.

CLASS 544.—Book-binding machines.

CLASS 545.—Paper-folding machines.

CLASS 546.—Paper and card cutting machines.

CLASS 547.—Envelope machines.

CLASS 525.—Paper making machinery and processes.

GENERAL REPORT

OF THE

JUDGES OF GROUP XIII.

PHILADELPHIA, 1876.

PROF. FRANCIS A. WALKER, *Chief of Bureau of Awards:*

SIR,—I herewith transmit the report of the Judges on Paper Industry, Stationery, Printing, and Book-making.

Respectfully yours,

JAMES M. WILLCOX, *President of Group XIII.,*
Judges of the International Exhibition.

GROUP XIII.

PAPER INDUSTRY, STATIONERY, PRINTING, AND BOOK-MAKING.

On entering upon our duties in the examination of the various classes of objects allotted to the Judges of Group XIII., a cursory glance over the entire Exhibition greatly impressed us with the magnitude of the work before us. No less than sixteen classes confronted us, some of which included many hundreds of objects; and the entire examination must, of necessity, extend over many thousands. The exhibits in Class 258, embracing stationers' articles, were very numerous and from many parts of the world; and, although very interesting, they brought to light little that was entirely new. Perhaps there is little room for absolute novelty in this class; but the ingenuity and skill displayed in perfecting the various articles that composed it were very apparent. Of fancy note-papers, envelopes, cards, etc., there was an endless variety, gotten up almost invariably in good taste, and made of the best material. The gold and steel pen manufacture seems nearly to have reached perfection; and the same may be said of every variety of brush, crayon, and pencil. The best pencils are still brought from abroad; but one line of articles made from American graphite was of great excellence, and bids fair to equal, in a short time, the best heretofore imported. The ink-stand has not yet reached perfection, and this fact seemed to be realized by manufacturers, who in their efforts have displayed an almost endless variety, and who pressed upon us with assiduity the superior claims of quite a number. India-rubber enters largely into this class, but the Exhibition has shown no very recent important extension of its uses for stationers' articles.

Within the past hundred years the manufacture of paper has been so much improved as to have undergone a complete revolution. Even during a considerable portion of the present century the bleaching of colored stock was impracticable; white paper was made from stock that came white into the mill; and the "beating" was accomplished by

pounding in a mortar. All paper was made by hand, upon "moulds," in separate sheets; and white paper was quite costly. A hundred years ago only "laid" paper was known,—paper made upon moulds laid with parallel strands of coarse brass wire. Woven metallic wire-cloth was not manufactured for paper-makers' use. About ninety years ago woven wire moulds were first introduced, and paper made upon them was called "vellum." In all books and instruments of writing a hundred years old parallel water-marks made in the paper by the coarse laid wires are distinctly visible. The wire-cloth was the first step towards manufacturing by machinery. The "Foudrinier" machine has taken the place of hands, and now runs out a web of paper six or seven feet wide at the rate of thirty or more yards per minute. The coarsest and deepest-dyed stock comes, in its roughest state, to the paper-mill, and is there made clean and white. Stacks of straw and logs of wood are reduced to fine white fibre; the pulp is sized before it is formed into sheets; and, with a few "roll" beating engines and one Foudrinier machine, a paper-mill now turns out daily as much paper as could be made by twelve ordinary mills, with as many vats, a hundred years ago.

Class 269, embracing all varieties of the finer qualities and styles of paper, was well represented, and the exhibits were very gratifying. In this class a marked difference was observed between the American papers taken generally, and those taken generally from abroad. A keener competition in the manufacture of fine paper has, for some years, existed here than elsewhere, resulting in a greater perfectioning of some qualities of paper; and a greater refinement in the various styles of presenting them to the market is quite apparent in the displays of American manufacturers. Among these qualities are, conspicuously, heavy letter and note, cap, and ledger papers; above all the last. These papers, as produced by leading American manufacturers, were found to be made invariably of the best and best-mixed stock, of unexceptionable colors in white and blue, of generous thickness, and sized with animal sizing in the sheet. The low rate of postage in the United States has, no doubt, encouraged the production of thick writing-papers pleasant to use; and the enormous American demand for large blank-books has stimulated the competitive manufacturers of these to demand of the paper-makers the best quality of ledger paper that can be made. This demand is admirably supplied, and the exhibits of American paper of this character called forth expressions of admiration from many foreign visitors. The foreign papers generally, on their side, displayed some points of excellence over the American. Owing to higher rates of postage in

other countries, their writing-papers have been for many years made exceedingly light; and European manufacturers have, almost universally, attained to greater perfection in very light papers. The Exhibition has not indicated any important departure from the old rule of very thin letter paper that has so long obtained in Europe. In Great Britain, France, and Germany, particularly, great skill and science have been directed to producing the best grades of paper from inferior stock, and manufacturers there have thus cheapened the cost of good paper. In the colors and tints of their fancy papers they have reached great perfection, and in these points they excel American manufacturers. The Russian papers were found to be of excellent stock, which seems to abound in that country, and the Russian exhibits were good. The Italian papers in the Exhibition were nearly all hand-made, of good stock, good color and texture, very strong and serviceable, but of lower finish than most others. Some of these were of remarkable size for hand-made paper, and showed great skill in hand-manufacturing. The exhibit of Spanish papers was large and varied and contained much excellent paper. Their cigarette papers were remarkable for fineness, strength, and other qualities that show a thorough knowledge upon the part of the manufacturers of the taste to which they have to cater. Nearly every Spanish exhibit contained specimens of cigarette paper; and it is worthy of remark that nearly every paper exhibit from the Continent of Europe, from Spain to Russia, contained excellent paper of this kind.

The only specimens of photographic paper shown came from France and Germany. This paper is difficult to perfect, and its points of excellence have not been much studied by American manufacturers. It is necessary that it be perfectly free from particles of iron and steel, no matter how minute, as these would be developed into stains by the regular treatment it has to undergo in the photographer's laboratory; and the American plan of beating the stock with a steel-armed roll upon a steel bed-plate, precludes the possibility of having the paper absolutely free from liability to iron-stain. When any one of our mills shall adopt the expensive European plan of using brass exclusively instead of iron or steel, there need be no serious difficulty in manufacturing the best of photographic paper. A feature in which nearly all European manufacturers excel is in pulp- or engine-sizing. In this they leave American manufacturers far behind. It is noticeable that, whereas the latter size all their best and medium writing-papers in the sheet with glue sizing, the former produce a very hard-sized paper by the cheaper process of pulp-sizing. This process should receive greater attention in our country, and there is no good

reason why the medium grades of American writing-paper should not be produced in mills that do not possess drying lofts, as in older countries.

In confirmation of my views regarding American blank-books and paper, I am glad to be able to present those of Mr. Gustav W. Seitz, of Hamburg, Germany, one of my associate Judges, and a gentleman of great experience and accurate judgment. These have been given me in the form of a letter; and, as the whole communication is in reference to the work of our group, I transcribe it entire.

"PHILADELPHIA, July 24, 1876.

"JAMES M. WILLCOX, ESQ., *President of Group XIII., International Exhibition, Philadelphia:*

"DEAR SIR,—In compliance with your request to name such articles observed by me as were worthy of special notice on account of their excellence, I beg to state the following regarding American exhibits. The binding of books, as well as the manufacture of blank-books, is, as to solidity and execution, decidedly the best that I have seen in the Exhibition. The same judgment applies also to plain and illustrated printing, which, in beauty and clearness, by using the best materials (paper and ink), can compete with anything displayed. It is quite natural to make mention here of the imprinting machines, which, being mostly constructed in a very ingenious way, aid very largely to accomplish such work.

"The patterns and castings of the types also are elegant and worthy of being copied; and, all considered, I can well assert that the graphic arts in the United States are at the height of the times. It is, of course, not my intention, in giving this testimony, to undervalue the merits of my own and other nations; yet it is true that no department is as well represented, comparatively, as the American. It is an agreeable surprise to me to become acquainted with the above-noted facts, which so clearly show the progress made by America in the graphic arts, and I shall not fail to make them known in Germany, being confident that many will be benefited thereby.

"I remain, dear sir,

"Yours very respectfully and sincerely,

"GUSTAV W. SEITZ."

One feature, as I have stated, in which the European manufacturers of paper excel, is the variety and excellence of their colors in fancy papers. A longer experience in this line, and a necessity to cater to a greater public taste for fancy papers, have placed them

quite in advance of our manufacturers in this art; yet a great advance has been made here within a few years, and some of the American exhibits made a very handsome show of colors.

Very little bank-note paper was found; the most noticeable exhibit being that of a Massachusetts house of long standing and excellent reputation. In this character of paper American manufacturers have long held pre-eminence. This fact is probably explained by a comparison of the circumstances attending the issue of the respective paper currencies of Europe and the United States. In the former, until within a few years, no small notes were used, and the notes of large denominations circulated only among the wealthier classes. They were consequently little handled, were kept clean, and circulated but a short time, being generally retired when once redeemed at their place of issue. It was not important that the paper for them should possess wearing qualities in a high degree. In our country, on the contrary, we are accustomed to notes of small denominations; and for a very long period, among all classes of people, paper has generally been the material of currency, in denominations of one dollar and upwards; and notes have been repeatedly issued, to save cost of new ones, long after they became unfit for public use. The frequency of counterfeiting in our country rendered necessary costly engraving and printing, and American bank-notes are, compared with most others, very expensive; hence a reluctance on the part of our banks to frequently renew them. These circumstances explain the demand, on the part of the banks, that their paper should wear as long as possible; and the demand has been well met upon the part of our manufacturers. The exhibit of its special currency-paper, shown by the United States Treasury Department, in the Government Building, was entered simply as a contribution to the Government's general exhibit, and not for competition. Its special feature is a localized colored fibre, so incorporated into the sheets as to appear only in a fixed part of each note when printed, and not elsewhere. This paper has been in use since 1869, is essentially American in discovery and manufacture, and is now used exclusively by the Government, for the bonds of the Funded Loan, the National-Bank notes, and United States Treasury notes of all denominations. One interesting exhibit of paper of bank-note character turned up unexpectedly in the Mexican department. This paper was indifferently well sized and woven, but was of remarkable strength and pliability. It was manufactured from the leaf-filaments of the maguey plant (*Agava Americana*), of which a specimen, growing in a flower-pot, was brought from Mexico for exhibition. The provincial name of the plant is *Quiote*, and it is described as one

of the most characteristic and common plants of Mexico, growing throughout the low valleys, where it has long been cultivated for its juice, which is made into a fermented drink. On the mountains it grows wild, and the largest plants found are near Llanos de Apan, between Vera Cruz and the city of Mexico. Somewhat resembling a cactus, and possessing spines, it spreads its long, fleshy leaves to a diameter of six to eight feet, from the centre of which rises a straight stem ten feet high, tipped with yellow flowers. It is propagated by transplanting suckers that spring up from the roots and grow vigorously. When the filaments are prepared for paper stock the leaves are hackled green, the flesh easily separating and leaving behind a good handful of fibre. I have described this plant somewhat minutely, since, from the best information I can gain, it promises to be, in the future, of great utility in paper-making, especially as I learn that it can be cultivated at a very low cost.

Of printing-papers (Class 260) the display was not great, and there seemed to be but little inducement to bring them from abroad for exhibition. Those shown from there were of a more natural color than the American book-papers, which, to meet a taste on the part of our publishers that is not to be commended, are bleached to such an extent, and supplemented with a delicate tinging of blue and red, as to become of too dazzling a whiteness to be either pleasant or harmless to the eyes. Some displays, however, of a more natural or creamy tint, seemed to promise a prevalence of better and healthier taste in the future. The cost of printing-paper is as low as it was twenty years ago, and of some classes lower. At that time the supply of raw material was getting scarce, and it seemed probable that paper would become higher every year. The necessity of the case, however, stimulated invention and developed the use of, first straw, and then wood, as partial components of printing-paper. The perfecting of wood-fibre has advanced farther than that of straw; its admixture has become common in both news- and book-paper; and to this is due, principally, the present low prices of these papers in the market.

There were several very interesting exhibits of wood-fibre pulp for paper-makers' use, some prepared merely mechanically, by grinding the fibre from the block, and some by a disintegrating chemical process. That prepared in the latter way (which is by hard boiling in alkali under high pressure) is much superior, having greater length, strength, and flexibility, and being much more free from natural gum and all else that is not pure cellulose. The wood-pulp exhibited from the United States was principally from poplar; that from Sweden and

Norway (the most important European exhibits) principally from pine. The latter, though less pure, had greater strength, and was the strongest that I had ever seen, which leads me to believe that the pine of those countries possesses unusual toughness of fibre, and is peculiarly well adapted to the manufacture of paper-pulp. Other interesting exhibits were made of raw materials for paper, among which was the maguey plant, from Mexico, already described, esparto and other grasses from Spain, banana-leaves and "halfa" from Egypt, and quite a series from Victoria, Australia. Halfa is a species of swamp-rush resembling esparto, growing abundantly in Egypt, and the paper made from it was fair in quality and color. That made from banana-leaves was of a pleasing buff, natural color, and was handsome when printed and bound.

In the Victoria department were many specimens of paper, made from various fibres, rather crudely prepared, some of which, I am satisfied, could be well utilized in the manufacture of finer papers. I deem this matter to be of considerable importance, and cannot so well do it justice as by transcribing in full the following letter to the Commissioners from Victoria, from the Curator of the Melbourne Botanical Gardens, explanatory of the exhibits of paper-fibres and various dyes. It is as follows:

"GENTLEMEN,—I have the honor to furnish, as you request, a description of the fibres, gums, resins, dyes, woods, carpological specimens, etc., prepared and sent by me to the Melbourne Exhibition and which you have been pleased to forward to Philadelphia.

"As regards the fibres, papers, and woods, it must be admitted that they far exceed in number those sent from this establishment to former Exhibitions. The whole of the exhibits described were prepared by myself and two assistants, with but crude appliances at our command, and within eight weeks prior to the opening of the Exhibition. The greater portion of the necessaries forming the laboratory which once belonged to this department had been transferred to another branch; thus I have had to make the best of the few opportunities afforded me for preparing in so short a time the present collection. The fibres, some forty in number, were produced in a very primitive way; the branches or leaves of the plants being merely steeped in water, and afterwards combed by hand. The quality and quantity, however, of each kind thus prepared will, I trust, serve the purpose of testing their commercial value at Philadelphia.

"Many new discoveries in the way of fibre-yielding material are shown, not only of Victorian native products, but those of the other

colonies acclimatized here, and of exotics also hitherto esteemed only for ornamental purposes in gardening.

"Had time permitted, my collection of exhibits would have been far greater. I should have been able to collect and test the value of many plants which I know exist on the borders of Gippsland, and even nearer to Melbourne,—I mean the Macedon and Dandenong Ranges. It is almost needless for me to say that the colony of Victoria affords great facilities, both as regards soil and climate, for the cultivation of the valuable commodities which constitute fibre and paper material. For instance, the Chinese grass-cloth plant, *Bœhmeria nivea*, the New Zealand flax, *Phormium tenax*, the *Fourcroya gigantea*, the *Agaves*, the *Lagunaria Pattersoni*,—cowitch-tree of Norfolk Island; the *Yuccas aloifolia*, *filamentosa*, and *gloriosa*; the *Abutilons* and *Hibiscus*, of India, China, and America; the *Sparmannia Africana*, and a host of other foreign plants all thrive as well, and in some instances better, in this colony than in their native homes.

"The samples of *Sparmannia* sent to the Melbourne Exhibition have been prepared from both the living and dried barks of the shrub. I have never read of its ever having been discovered that this plant contained a fibre of any value. Hitherto I had only known it to be interesting as an ornamental shrub, or the plant in whose blossoms the great Linnæus first discovered the sexual system in botany. My introspection of its fibrous nature, as with others now exhibited, was only gained by mere accident in a hurried attempt to collect and prepare a variety of fibres for your Exhibition; but if even one of them prove to be of commercial value—and I believe many of them will, because of their textures and the quickness of their growth—the object I have in view will be gained, as they will be a boon to the colonists. The *Sparmannia*, like the grass-cloth plant of China, as soon as cut, shoots up, even in a poor soil, with wonderful vigor. The canes, if I may call them such, are often as thick as one's thumb, and they average in height from six to eight feet. In good soil two crops may be safely reckoned upon in the year.

"The plants of Queensland, from which fibres have been prepared, have all been grown here, and were introduced by the late Mr. Dallachy and the Baron von Müller, my predecessors in the directorship of these Gardens. Judging from the growth of the *Hibiscus heterophyllus*, *Sida retusa* (Queensland hemp), *Pipturus propinquus*, or Queensland grass-cloth plant, *Brachychiton acerifolium*, 'the flame-tree,' *Sterculia rupestris*, 'the bottle-tree,' and the samples of fibre now produced from them, the harvest to be gained by their cultivation in Victoria would be as great as in the sister colony. It may

appear strange to many that plants like these and others described, indigenous to a warmer clime, should thrive as well, and even better, in this cooler one, yet there are ample proofs that such is the fact. The growth of the flame-tree, for instance (*Sterculia* or *Brachychiton acerifolium* of Queensland and New South Wales), is more rapid in Victoria than in either of the colonies mentioned, and the *bast* furnished by this tree is, I consider, superior to *Cuba bast*. This, of course, remains to be proved by those in Philadelphia, who are better able to judge of its merits, and of others which I have described in my list. But it is more singular still to observe that plants which grow side by side with these in warmer latitudes, will not grow here at all, but merely exist. *Laportia gigas* is the great stinging-tree, of which I have sent samples of fibre from plants which never attain in this garden more than four feet in height,—being cut down by frost every winter,—yet I have seen it beside the flame-tree in the brushlands of Queensland and New South Wales attaining a height of seventy-five feet, and with a trunk more than five feet in diameter.

"The *Pipturus propinquus*, *Sterculia rupestris*, *Sida retusa*, and many others, grow as quickly here as in Queensland. Quite as good results, therefore, might be expected by cultivating these plants; but need we go farther than our own colony of Victoria for quality or quantity of fibre or paper material, when our forests teem with valuable plants suitable for their manufacture? If we only instance the *Pimelias*, *Dianellas*, *Plagianthus*, *Caladiums*, *Lepidosperma*, or 'mat-grass,' *Commersonia*, *Brachychiton populneum*, *Urtica incisa*, *Cyperus*, *Typha*, *Scirpus*, *Carex*, *Isolepis*, and the rushes *Juncus vaginatus*, *maritima*, and *pauciflora* (and there are scores of other indigenous plants equally valuable), rags need no longer be collected for paper-making, nor introductions from other countries for cordage. With sixty millions of acres of good land included between the parallels 30° and 39° south latitude, we can, without cultivation, reap abundant harvests of paper material, even from various species of *Eucalypti*, *Xerotes*, *Melaleuca*, *Cyperus*, and others, and, indeed, from some of the grasses which are plentiful in their midst. Our native vegetable resources are great, and should therefore be thoroughly searched up. My thirty crude samples of paper, which are sent in frames, were prepared under great difficulties, and they were only made to prove what can be done with some of our native plants. Many of them are new, but the indefatigable Mr. Ramsden, of the Victorian Paper-Mills, has devoted his attention particularly to the manufacture of paper from Victorian plants, and he will, no doubt, be able to add

to his collection long before the colony has been thoroughly explored.

"The dyes, forwarded in bottles, are not so numerous as they would have been had time permitted me to send out collectors; but the samples of silk, calico, and woolen material stained with them show a variety of beautiful colors, the value of which will, no doubt, be proved at Philadelphia.

"I regret to have to say that my collection of woods could not be properly seasoned. Some of them were polished within a week after they were cut from the tree, consequently many of the specimens have split from end to end.

"I have the honor to be, gentlemen,

"Your obedient servant,

"WILLIAM R. GUILFOYLE,

"*Director of Botanical Gardens, Melbourne.*"

The display of blank- and account-books (Class 261) was remarkably good. From Europe were specimens of books made up of very strong and excellent paper, principally hand-made, with most solid covers sheathed with metal over the wearing parts, closed with lock and key, and in every respect admirable. These were few, and the foreign display was confined almost entirely to France, Italy, Germany, and Russia, doing much credit to all. The American blank-book manufacturers, especially, but not exclusively, those nearest the Exhibition, in this city, made very large and handsome exhibits. On the merits of these I prefer to give the judgment of Mr. G. W. Seitz, of Germany, my associate Judge, who writes: "The binding of books, as well as the manufacture of blank-books, is, as to solidity and execution, decidedly the best that I have seen in the Exhibition."

The manufacture of papers belonging to Class 263, building-papers, has vastly increased within a few years, and many new applications of them have been made. The quality also has improved by the admixture of hemp and manila in much larger quantities. These papers are used natural or saturated with bitumen, and are sometimes printed in either water- or oil-colors. They cover roofs and floors, line inside walls, protect outside walls, line cisterns, underlie carpets, displace mattings and oil-cloth, dispense with lathing and plastering, and find a number of uses that increase every year. This increase is good evidence of their economy and utility; and the exhibits were, in the

order of their quality and magnitude, 1st, from the United States; 2d, Sweden; 3d, Japan; 4th, France. The Japanese papers of this character were the strongest and best shown, being made principally of mulberry-bark, and enameled with oil-colors and varnish in the most perfect and durable manner. These were floor-papers only, and the various other species of building-papers shown by other countries were not exhibited by Japan. Very little Japanese paper is made from rags, or linen or cotton fibre; but most of it is made, in a primitive way, of materials obtained from plants which are specially cultivated for the manufacture of paper and for no other purpose. The most important of these plants is the *Kodzu;* then come the *Gampi*, the *Mitsumata*, the *Kuwa*, or mulberry-tree, the *Hi-no-ki*, a species of wild-cherry, and several others unknown to us. It is the bark only of these shrubs and trees that is used, and not the woody fibres. The better qualities of paper are made in workshops arranged for that special purpose; but most of the paper of Japan is home-made by farmers, at times when their fields do not require their whole attention. Such paper as we are daily accustomed to see is manufactured from rags, and only in the regular paper-mills recently built at Tokio, and which are provided with foreign machinery.

Of Class 264, embracing wall- and other ornamental papers, there was an excellent display; and it is much to be regretted that France, which notably excels in the manufacture of these kinds of paper, sent none of her best wall-papers to the Exhibition. But one notable exhibit came from Great Britain, and it might well serve for a suggestive model to our designers of decorative paper. Sweden showed specimens from several of her principal manufacturers, among which rich and bright designs in velvet and colors were numerous. Warm tints predominated, and the patterns, not suitable for American taste, indicated the climate of the country from which they came, and would seem to accord well with a refined taste modified by the protracted winters of the far North. Italy presented a very beautiful book of patterns, from Naples, that was in keeping with the well-known Italian artistic taste. The ancient frescoes upon the recently uncovered walls of Pompeii were there reproduced with accuracy; and the finest minutiæ of all the designs had received great care and pains. These papers were well worth the study of our producers of paper decorations, and might aid in forming a true and high artistic taste. What principally distinguishes the European wall-papers generally from those of this country is that the former are mostly made up of specific designs, each very complete in itself, that court inspection and study, the general effect being subordinate to the particular ex-

cellence of the parts; while with the American papers the general effect is principal, the shades and designs more blending, and the finished details of the finest papers of Europe generally wanting. This general effect aimed at by our manufacturers is not too much at the expense of minutiæ for the prices that they are able to obtain; and it is certainly admirably produced according to their aim. Any other style would not meet their market, and their efforts are naturally put forth to perfect the styles that will sell. There are exceptions to this rule, and in one of the principal American exhibits there were perfect and cheap copies of very fine foreign designs. Nothing is here meant in disparagement of American designs, for differences in taste may well exist, are frequently radical, and are due to the unalterable characteristics of a people. The American machinery for printing wall-paper has reached great perfection, and more than twenty colors are sometimes printed from as many cylinders during one continuous operation. Very handsome specimens of decorative paper were to be seen in the German department, and Russia presented quite a number, some of which were peculiar and quite attractive.

From the Netherlands came imitations, on paper, of fine and variegated marbles, of ornamental woods, and of inlaying of woods of various textures and colors, that were very perfect, and quite superior to anything of the kind found elsewhere. Correct Flemish taste and patient Flemish labor were conspicuous in these elaborate imitations. Suspended from the walls of the office of the Commissioners from Belgium were admirable imitations, in heavy embossed paper, of the old leather hangings of Malines and Cordova. So perfect were they, that close inspection only could satisfy one that remnants of these famous leather decorations were not before him.

Of ornamental papers, for book-binders' use, a very fine exhibit came from New York, and two exhibitors, from Austria and Bavaria severally, presented books of patterns of marbled and other fancy papers that seemed absolutely perfect of their kind. If these could be purchased and retained in the United States they might, in the future, contribute largely to the perfecting of the products of our book-binderies.

In paper-making machinery there were few exhibits, and all American. In this branch of manufacturing Americans are not excelled, and this may partly account for the absence of foreign exhibits in it. Machinery of this kind, too, is heavy, and expensive to handle, and could not naturally be expected from abroad when no hope of prospective remuneration is entertained. An entire paper-machine was in operation in Machinery Hall, erected and run at great expense by

the builder. This was critically examined by practical judges and deemed to be excellent in all its details. It contained some important improvements, and manifested an ambitious and intelligent desire in the builder to accomplish real progress. The demand in this country for highly-finished book-paper has wrought great improvements in the apparatus for super-calendering in the web; and the several such exhibits would seem to indicate that nothing much more complete need reasonably be looked for. One most important improvement in calendering machinery is of the last ten years, and consists of a stack of from eight to twelve small rolls, not of ordinary cast-iron, as of old, but of chilled iron with a surface as hard as steel. Three exhibits of these were brought from Wilmington, Delaware, in which each roll had been separately ground and polished so accurately that the faintest glimmer of light could not pass between any two rolls when put together. So great is the accuracy obtained by the new process of singly polishing, that any two rolls of all these exhibits might be placed together and touch each other throughout their entire lengths.

The envelope-machines were equally interesting and satisfactory, and a most important addition has been made to these within a few years. Formerly the "blanks" for folding were run out by hand, and the flaps that are finally closed were gummed by a brush and dried. This was to allow the machine to make up and press together the envelopes without an adhering of the last flap when folded. The latest improvement permits the whole envelope, including the last flap, to be gummed by machinery at one process, after which it is carried some minutes through the air to dry the last flap before folding it down previously to counting and banding. This is perfectly well accomplished, and considerable labor is saved thereby. One machine cut the envelopes automatically from narrow rolls, with a minimum waste of paper, and a cheapening of the product seemed to be effected to a considerable extent by this plan. Envelopes made by the machine exhibited were very perfect, and made with great economy, and it is probable that there is little room for further improvement in that direction.

One of the most important parts of our labors was the examination of articles included in Class 540, which embraces all kinds of printing-presses. This was a study of the "art preservative of all arts," and all progress made in it ought to be viewed as important to the progress of mankind. A great number of presses for various purposes, including roller-presses for bank-note work, were exhibited, many of which were kept in pretty constant operation. Most of these were

American, and the most notable foreign presses were from England, France, and Germany, all of the very best character. The immense issues of the principal newspapers of the large cities of Europe and America, and the few short hours in which they have to be printed, have demanded new facilities and greater rapidity of printing than was possible by feeding sheet by sheet. Within a few years only this demand has been supplied, and presses now take the paper in large, continuous rolls, pass it rapidly between cylinders covered with circular stereotyped plates, print both sides in quick succession, divide the broad web into two running narrow ones, cross-cut them precisely in the middle of the margins, fold each sheet neatly twice, and deposit all in rows at the rate of over twenty thousand newspapers per hour. A printing-press of this character deserves to rank among the great feats of the mechanic arts, and the three exhibited drew for many months crowds of observers, and were universally recognized as being among the wonders of the Exhibition. These three were the Walter press from England, exhibited by Mr. Walter of the London *Times*, the Hoe press from New York, exhibited by R. Hoe & Co., and the Bullock press from Philadelphia, exhibited by the Bullock Press Co. The latter company boldly placed in competition a press of unusual width, and printed two sheets at a time of the New York *Herald*, on a roll of paper sixty-three inches wide. The web of double width was then rapidly slit in two, and cross-cut into separated sheets. The Hoe press was also double, and printed two sheets at a time of the Philadelphia *Times*, on a roll of paper fifty-two inches wide, which it then slit and cross-cut, after which it carried the separated sheets forward for an additional operation. This was the folding; and the process was effected by two folders, one on each side, folding each sheet twice, and delivering it with absolute exactness, without a single fault. The Walter press was narrower, and printed a single sheet of the New York *Times* on a roll of paper thirty-six inches wide, which it cross-cut and delivered flat. Its speed was greater than those of the wider presses, and the work of each was admirably done. The following is a summary of the competitive trial:

WALTER PRESS.

Printed the New York *Times*, size 36 by 46⅝.
Web of paper 36 inches wide.
Number of copies printed in an hour 10,455.
Number of running yards printed in an hour 13,486.
Number of square yards printed in an hour 13,486.

HOE PRESS.

Printed the Philadelphia *Times*, size 26 by 37½.
Web of paper 52 inches wide.
Number of copies printed in an hour 21,810.
Number of running yards printed in an hour 11,359.
Number of square yards printed in an hour 16,401.
Slit the web, after printing, into two sheets, and folded each sheet twice.

BULLOCK PRESS.

Printed the New York *Herald*, size 31½ by 45⅜.
Web of paper 63 inches wide.
Number of copies printed in an hour 14,856.
Number of running yards printed in an hour 9388.
Number of square yards printed in an hour 16,372.
Slit the web, after printing, into two sheets.

For further particulars of this remarkable trial of merit I refer to the following letter of Sir Sydney H. Waterlow, Bart., M.P., of London, one of my associate Judges, a gentleman eminently well qualified to judge of the merits of printing-presses, and who gave to those of the Exhibition a special and careful examination. The letter contains also very valuable general observations upon the printing-presses of various kinds exhibited, that should be publicly presented to that part of the community interested in such information.

"INTERNATIONAL EXHIBITION, PHILADELPHIA, July 11, 1876.

"TO THE PRESIDENT OF THE UNITED STATES CENTENNIAL COMMISSION:

"SIR,—The exhibition of printing-presses in Machinery Hall and elsewhere is perhaps one of the most remarkable features of the International Exhibition. It is impossible to examine them without being struck with the extraordinary excellence and completeness which characterize these exhibits. No description of printing-press is unrepresented, and many different varieties are represented by several examples and sizes from the same manufacturer.

"There are nearly sixty exhibitors, showing more than one hundred exhibits in this class, and it is a matter for congratulation that scarcely one of them is without its own excellences and special usefulness. That some are better than others is a matter of necessity; but it is for the opportunity of making comparisons between one article and another of the same class that International Exhibitions have their great value. Of the large and more powerful presses, no such collective display has ever before been witnessed, one firm alone showing

no less than a dozen of their large and well-known cylinder-presses for the different branches of printing.

"For fast newspaper-presses, some of them at work every day, the Exhibition has never been equaled, especially the Hoe, Walter, and Bullock presses, while the number of small job-presses, worked either by hand or power, is as encouraging as it is surprising.

"The exhibition of presses may be classified into five main divisions:

"1st. Web presses for printing newspapers very rapidly.

"2d. Large presses for fine illustrated work, requiring thoroughly efficient rolling and a slow, steady impression.

"3d. Presses for printing newspapers from cut sheets, with either double or single cylinders.

"4th. Presses for small newspapers, book-work, pamphlet- and jobbing-work.

"5th. Small job and amateur presses.

"In the first division—web newspaper-presses—there are five competitors: the Bullock double press; the Hoe double press, with folder attached; the Hoe single press, with accumulator; the Walter single press; and the Campbell press. It is no exaggeration to say that no such collection of fast printing-presses was ever before brought together. Differing materially in construction, and in the various arrangements for cutting, etc., they one and all possess such marked excellences as to render them very valuable specimens of working machinery, and to entitle them to great commendation. These presses have been tested in every conceivable way, as to their general capacity, number of revolutions per hour, steadiness in running, damping, cutting off, character of work done, strength of web, time lost in putting on last plate, changing rolls, etc. In nearly every test all the presses exhibited a high standard of excellence.

"In a run of one hour, which was by far the most critical test to which the presses were subjected, the Bullock double press printed 14,856 copies of the New York *Herald*, making 7428 impressions; the Hoe double press, with folder attached, printed 21,810 copies of the Philadelphia *Times*, making 10,905 impressions; the Walter press printed 10,455 copies of the New York *Times* from a single set of plates, making 10,455 impressions in an hour.

"In order to arrive at the exact relative speed of each press, it is only necessary to multiply the number of copies printed during the test hour by the length of each sheet as it leaves the press, and so find out the actual length of paper actually run through the press and printed during the hour. The Hoe double press printed 21,810 copies of the Philadelphia *Times*, or 10,905 copies to one set of plates.

The length of the sheet as it left the press was 37½ inches. The Hoe double press therefore ran 11,359 yards of paper. The Bullock double press ran 14,856 copies of the New York *Herald*, or 7428 copies from one set of plates. The length of the *Herald* is 45½ inches. The Bullock double press therefore ran 9388 yards of paper. The Walter single press ran 10,455 copies of the New York *Times* over one set of plates. The length of the *Times* is 46½ inches. The Walter single press therefore ran 13,504 yards of paper.

"During the test hour the Hoe lost 14¼ minutes in changing paper-rolls, snapping the web of paper, and melting the composition rollers. The Bullock lost 8¾ minutes changing the rolls of paper, snapping the web, etc. The Walter press lost 6½ minutes changing the rolls of paper and a break in the web. The working of the folder on the Hoe double press was very smooth and regular; the open arrangement of the folder afforded great facility for the rapid removal of a jam; and the papers were all smoothly and regularly folded. The folders worked with precision, and without a hitch throughout the test. The cutting arrangements on the three presses are probably of equal excellence.

"On the 11th of July a trial was made of the Hoe single press with the accumulator. This form of delivery has been in use most successfully for many years, and the trial proved abundantly that the confidence which the printers of daily and weekly papers having a very large circulation have given to this machine has not been misplaced. The test continued for 36 minutes. During this time the machine produced 6200 papers. Allowing for three stoppages, delaying 6½ minutes, the speed while running rather exceeded the rate of 12,500 impressions per hour.

"The second division consisted of large presses for fine cut work, etc. Those exhibited by Messrs. Potter & Co., R. Hoe & Co., and Messrs. Cottrell & Babcock are unexceptionably fine. Several are in practical operation, and the character of the work printed is very fairly represented by sheets of the splendid illustrations of Messrs. D. Appleton & Co.'s *Picturesque Europe* and other similar works. The printing of such delicate work, requiring as it does the greatest accuracy of adjustment and extreme regularity of working of the press, can only be executed on presses of the highest class, design, and construction.

"In the French section three excellent presses exhibited by P. Aluzet & Co., of Paris, although not in practical operation, nevertheless received a most careful examination from the Judges in the group. The presses are exceedingly well designed and constructed, and are entitled to more than ordinary commendation.

"Among the exhibits of the third and fourth divisions will be found the presses manufactured in larger numbers and more in use than any others for ordinary purposes in the printing trade: double and single cylinder-presses for printing newspapers from cut sheets, at a high rate of speed; presses for ordinary book- and pamphlet-work, prospectuses, circulars, posting bills, and all the various kinds of printed books and forms required by railway companies, banks, and commercial firms. These presses are on the whole most creditable to the manufacturers exhibiting them, having been carefully constructed and well adapted to the different classes of work. Great progress has been made during the last ten years in presses of this description, resulting in greater efficiency and greater saving of labor.

"Division fifth: small job and amateur presses. The display of these presses in every variety of form, shape, and size, by a large number of manufacturers, is the strongest indication of the growing interest taken in the details of the art of printing by a constantly increasing number of persons not engaged in the printing business. Very many of these presses have been especially and very successfully designed to give facilities to amateurs to indulge in the very interesting amusement of printing. These amateur presses are not only well designed but low in price.

"The great variety of small job-presses has also proved most useful in general printing-offices, when worked by an adept, turning out excellent work either plain or in colors, and enabling master-printers to employ their boys and apprentices with great advantage and saving in cost of labor. Great care has been bestowed in the arrangements for giving perfect rolling and distribution in most of these presses, and much praise is due to the several makers for the creditable manner in which they have been turned out.

"A most careful examination has been made by the Judges in Group XIII. of all the various classes of printing-presses; and, as some evidence of this, and for detailed explanations of the special merits of particular presses, I refer to the large number of reports in this class sent in by the individual Judges of the group.

"I cannot conclude these few remarks without congratulating the authorities of the Centennial Exhibition on the very extensive and admirable display of printing-presses, never, I venture to think, excelled at any previous Exhibition in the civilized world.

"I remain respectfully yours,

"SYDNEY H. WATERLOW,

"*Judge for Great Britain in Group XIII.*"

The following communication received from Mr. William Faxon, one of my associate Judges, contains a very interesting history of the printing-press during the past hundred years, and I am happy to place it before you as a most valuable part of this general report:

"THE PRINTING-PRESS.—IMPROVEMENTS DURING THE CENTURY.

"Scarcely any branch of the industrial arts has received more important improvements during the past hundred years than the printing-press, and almost at a glance these improvements have been made apparent to the hundreds of thousands who have visited the Exhibition, by the admirably arranged exhibits of Messrs. Hoe & Co. and the Campbell Printing-Press Co., in each of which is shown a "Ramage" press over a century old, as well as the beautifully-constructed and rapidly-working presses of the present day. The one carries us back to the commencement of the period we are celebrating, while the other embodies the latest and greatest triumphs of inventive thought and genius.

"The construction of a printing-press followed close upon the invention of printing by blocks and movable types; but it was originally little more than upright posts connected by cross-beams, through one of which a screw worked to give the impression, with a rude arrangement for running the type under the platen. Improvements were made from time to time, the most notable of which was in 1620, by Blaeuw, of Holland; but the screw-and-lever press, with modifications of the original plan,—yet substantially as seen in our Exhibition,—was the only press in use until early in the present century, when important improvements were made in England, by Earl Stanhope, quickly followed by those of Clymer, of Philadelphia, and other inventors in this country and in Europe. The screw was discarded, and combinations of levers and toggle-joints were introduced, which, with various modifications, are in use at the present time.

"The hand-press, with the aid of two men, was capable of printing only about two hundred and fifty sheets an hour upon one side, and, as the increasing circulation of newspapers demanded greater rapidity, attention was directed near the close of the last century to the construction of power- or machine-presses. Wm. Nicholson, of England, in 1790, invented the first press of this description. The type was to be placed upon a cylinder, and the impression given by contact with another cylinder, as is now done in the most approved presses. Though not a success, it is indisputable that Mr. Nichol-

son's invention embodied many of the principles embraced in the latest constructed machinery.

"From this time on improvements were constantly being devised, but it was not until 1813 that a moderately successful machine-press was constructed. On the 28th of November, 1814, one was actually brought into use in the office of the London *Times*, the paper of that date informing its readers that they were for the first time perusing a paper printed by steam upon a machine-press. This press was invented by two Saxons, König and Bauer, and gave about eighteen hundred impressions per hour. In the course of a year or two a press which printed upon both sides of the sheet was devised, and, though only moderately successful as to speed,—throwing off but about one thousand perfected sheets per hour,—its work was well done; the machine was highly prized, and it was in use for many years.

"It is not our purpose to follow in detail to the present time the various improvements in the printing-press. We have indicated the origin of and the essential ideas embraced in the several early inventions. The names of Napier, of Cowper, and of Applegarth in England, of Richard M. Hoe and Isaac Adams in this country, are prominently identified with important and essential changes extending down to our own day. The latest and crowning triumph of invention for the rapid printing of newspapers is the web perfecting press, which, with the same manual labor required a century since to produce two hundred and fifty impressions or one hundred and twenty-five perfected papers of small size per hour, now prints, in the same time, from twelve to fifteen thousand mammoth sheets upon both sides; and the presses upon which the work was and is done, standing side by side in our Exhibition, testify more impressively than words can do to the vastness and the value of improvements made during the century. The wonderful creations of the Messrs. Hoe, of Mr. Walter, of the Bullock, and of the Campbell Companies, which have daily exhibited their powers to admiring thousands, would seem to leave little in addition to be desired in the future.

"But it is not alone in the rapid production of newspapers that improvements in presses have achieved wonderful success. The increasing taste for books, elegant in their typography both in letter-press and in illustration, has led to the invention of presses specially adapted to meet these requirements. At the commencement of the century books and papers were alike the product of the same press, and it was only by greater care in the printing and in the use of better materials that the typographical appearance of a book excelled

that of a newspaper. Presses are now constructed with all necessary arrangements for producing the finest book and cut work; the strongest ink is distributed with the greatest thoroughness; the rollers are made to pass over the forms any required number of times; and a firm, square, solid impression is given, so that the printed page has an appearance of elegance and perfectness until recently quite unknown.

"The smaller job- and card-presses are also an entirely new creation within the century; they are of infinite variety, are adapted for general and special work, and fill an important place in typographic art.

"Such has been the progress of improvements in the printing-press during the last hundred years,—marvelous as it seems and perfect as the machinery of the present day appears to us, seeming almost to be endowed with life, thought, and reason. It is not too much to believe, particularly when we consider the inventive genius of the age and the requirements of advancing civilization, that the next hundred years will witness improvements as great or greater than the last, and quite in harmony, too, with the progressive spirit of the times.

"WILLIAM FAXON."

I much regret not being able, at this late day (September 15), to see the Campbell web-press in practical operation. At several appointed times we met to see this press operating, but were always disappointed in our expectations. Great simplicity and originality are shown in its general plan; and there is a reaching after effects through almost invariably new devices. The press on exhibition shows, perhaps, the highest aims yet held by the inventor; and I am far from uttering any words in disparagement of it simply because the builder has not yet been able to overcome all the difficulties that stand in the way of perfect success. What we have seen is unquestionably a work of genius, and I cannot resist the belief that it will yet attain a marked success.

The Exhibition was rich in specimens of beautiful typography, but nothing absolutely new was noticeable except a plan for cheaply and rapidly composing titles and scripts, in letters and designs of the highest and most elaborate art. This was submitted by the Bureau of Engraving and Printing, in the U. S. Treasury Department, as an invention of Mr. G. W. Casilear, in charge of the engraving division. It is a plan only feasible in large and first-class establishments, where the highest art and skill can be commanded for the execution of original letters and designs, to be repeated; but it enables such establishments, by laying in a large store of the most perfect originals, to compose the titles and scripts of bonds, checks, certificates, bill-heads, etc., by cheaply transferring and combining these originals, instead of

separately engraving every design and script that they may have to produce in the course of a large and miscellaneous business.

Several "protective" papers were submitted for our inspection and report, viz., the "National safety paper," the "Commercial safety paper," and a paper printed with Francis L. Loutrel's sensitive ink. These are specially designed to prevent the alteration of checks and other evidences of value, and are all based upon the same idea, viz., a sensitive coloring that will be destroyed by any agent, chemical or mechanical, that discharges or erases the writing upon the paper, thus affording evidence of any tampering with the instrument. The papers of each party, written upon, were submitted to a rival; and, according to the best judgment of the examiners, all were fairly altered. I have always held that such devices are so many steps in the right direction, as tending to multiply and complicate the difficulties to be overcome by the forger and counterfeiter; yet, on the other hand, it is rationally maintained that any device publicly claimed to afford certain protection and sometimes failing to give it positively misleads the public, by causing men to rely upon a false security. Certain it is that men who practice fraud by raising checks are skillful experts, and may be safely matched against men of science in honorable callings; yet the latter find in no safety-paper submitted absolute defense against alteration. Of this fact we were assured by Dr. Charles M. Cresson, of this city, who stated to us, in the presence of representatives of several protective papers, that he had found none able to prevent him from altering a writing without changing the paper. It is not to be supposed that invention in this direction is exhausted, and that a partial failure, a failure to be simply perfect, is a total failure. The best that has been accomplished is very creditable, and narrows down the number of forgers to chemical experts; and enough is accomplished to promise more in the future.

The administration of the Exhibition can be congratulated upon the number and quality of the articles submitted to our group of Judges. They were indeed too numerous and important to have full justice done them by our best efforts. Our reports recommending awards for merit are not few, and attest our desire to be as just as possible to those many men of uncommon intelligence and earnestness who have expended so much time, money, and pains to contribute their productions as a part of the American Centennial Exhibition. Where we have erred in our judgment, it is probable that we have erred upon the side of liberality.

PAPER-MAKING MACHINERY AND FIBRES.

BY EDWARD CONLEY.

I have the honor to submit the following report in reference to a portion of the exhibits in Group XIII., together with a review of the fibres available for paper-making, classed in other groups.

Previous to the invention of modern paper, many different substances, all of them natural productions, were used for recording. Stone, clay, and waxen tablets, bark and leaves of trees, entrails of animals, parchment, papyrus paper, etc., were employed, each people making use of the substances most convenient to them. Papyrus paper and parchment, however, were most generally used by all the civilized nations until gradually superseded by modern paper. It is impossible to fix a certain date for the invention of this most useful article, but paper made from pulp was first in use among the Chinese, probably at a very early period in the Christian era. Thence, after a long lapse of time, it passed into Tartary, where, we are told, there was a paper-manufactory at Samarcand in 648. By the conquest of Tartary in 704, the Arabs became acquainted with paper-manufacture, and through them it was introduced into Europe at the time of their conquest of Spain. It was also introduced into Eastern Europe through the Greeks of Constantinople, whose knowledge of it was obtained direct from Tartary. This is what is known as cotton paper, which gradually took the place of parchment and papyrus, until in its turn it was superseded by linen paper, or paper made from rags. Many attempts have been made to fix a date for this important improvement, but without success. When or where linen paper was first made it is impossible to tell; we only know that it came into use about the middle of the fourteenth century, and in the fifteenth was used almost exclusively. It is a striking and significant fact that the use of linen paper should have become general just at the time of the invention of printing, as there is no fabric so well suited to meet all the demands of the press as this. The invention of printing naturally gave an impetus to paper-making, and from that time we find the paper-making interest continually increasing. The press and the paper-mill, those two powerful agents in the advancement of civilization, have gone hand in hand, progressing always towards greater perfection. It is, however, during the last hundred years, which have been so fruitful in improvements of all kinds with every race of civilized man, that the greatest progress has been made. In fact, from the time of the invention of modern paper, which is an aqueous de-

posit of vegetable fibre reduced to a liquid state, up to the close of the last century the progress in paper-manufacture was very slow. Since then the improvements have been so numerous, both in processes and machinery, that they far surpass all that had been made during the centuries of its previous existence.

A hundred years ago the process of paper-making was so different in its details from the present time that it might almost seem a different art. Then all the paper was hand-made, as machines for making paper were not invented for some years afterwards; and the little machinery used for grinding the pulp would now scarcely be deemed worthy of the name. The stock consisted of rags, which were converted into different kinds of paper, according to their texture and color, bleaching paper-pulp being then an unpracticed art. The great increase in the uses of paper, which grew up with the advancing state of civilization, produced a demand for a more abundant and less expensive material. By the aid of chemistry this demand has been met, and the use of alkalies has made it possible to employ many fibres for paper stock that previously were of no practical utility. By their means fibrous substances can be thoroughly disintegrated, and subsequently subjected to the modern bleaching process. Now the wood from our forests, the straw from our grain-fields, old paper from our waste-baskets, and even jute from far-away India, are staple materials upon which paper-manufacturers depend to keep their mills running. The rags, also, are subjected to processes at that time unpracticed, if not unknown, and those that formerly would have been thought unfit for making the lower grades of paper now become stock for the finer. Not only in the processes, but also in the machinery for paper-manufacture, the improvement has been almost without parallel. From the time of the invention of the paper-machine, about the beginning of the present century, which may be truly said to have revolutionized the art of paper-making, the inventions and improvements in the machinery used in its manufacture have been so numerous that it would be a work of great time to enumerate them.

PAPER-MAKING MACHINERY.

A sketch of the improvements made in paper-manufacture seems to be properly introduced by the invention of the Fourdrinier machine, for it is to this that the great change is mainly due. This was invented in France, in 1798, by Louis Robert, an employee in the paper-manufactory of Francis Didot. The credit of making the invention of practical utility, however, is due to the Messrs. Fourdrinier, of London, from whom the machine takes its name. These gentlemen,

at that time extensive stationers and paper-manufacturers, greatly improved the original machine, and in 1803 bought up all the patents that had been issued in reference to it. They still continued to improve the machine until, in 1806, it was so far perfected that the cost of manufacturing paper was reduced from sixteen shillings to three shillings and ninepence the hundred-weight. Previous to the invention of this machine, paper was made in sheets limited in size by the size of the mould; now it can be made over nine feet in width, and of any length, as the pulp passes over an endless web, and, moreover, with a great saving of time and money. When paper-machines were first introduced they encountered the same violent opposition that followed the introduction of machinery in general. Several machines were destroyed during the first twenty-five years after their successful introduction by workmen who had been trained to make paper by hand, and supposed that the use of machinery would take their vocation from them. Even to the present time the prejudice in favor of hand-made paper exists among some consumers, who imagine that it is stronger and better than machine-made paper. An examination of both kinds shows that the contrary is true, and that the most even, strongest, and best papers are those manufactured on machines.

The invention of the Fourdrinier machine was followed by that of the cylinder-machine. This was invented, in 1809, by John Dickinson, an English manufacturer, who is said to have been led to the invention by a desire to compete with a mill near his own in which a Fourdrinier was in operation. The cylinder-machine is well adapted to the manufacture of the coarser grades of paper, and especially to making pasteboards for the use of bookbinders and box-makers. When used for the manufacture of pasteboard, several cylinders are worked in connection, by which means a sheet of pasteboard containing two or three thicknesses of paper may be made by one operation.

Since their first introduction machines have been very much improved; especially within the last sixty years, by the addition of several attachments. Among these may be named the pulp-dresser, for screening the pulp and freeing it from all foreign matter; the dryers or steam-cylinders, for drying the paper as it is made; and the paper-cutter, for cutting the web of paper into any desirable size.

Another adjunct of the paper-mill, known as the super-calenders, has been introduced within the last fifty years. These are used for glazing fine papers, and consist of four iron- and four paper-rolls in one stack, through which the paper passes from one to three times. In the United States these have in a great measure taken the place of

the plating-machines used in other countries. Ledger, flat, writing, and fine papers of all kinds, except the first grade of plate-paper, are glazed upon these machines. Within the last few years the use of chilled iron calender-rolls has become very general. They are attached to the machine, and glaze the paper as it is made. To a certain extent these have proved successful, particularly for news-paper and the lower grades of book-paper. For the finer grades they are neither so good nor so economical as the super-calenders. When the paper is glazed as it comes from the machine, it must pass through one or more stacks of calenders, containing from seven to eleven rolls each, in order to get a high finish. The percentage of waste in this mode of glazing is sometimes very great, and materially increases the cost of production. Moreover, when the paper is glazed by one operation it must receive an enormous pressure, which gives it a greasy appearance, and, from the non-elasticity of the chilled roll, the least lump is crushed flat until it becomes a dark, transparent spot. If the paper is only partially glazed as it comes from the machine, and is then passed two or three times through a stack of super-calenders, it receives the pressure gradually, and owing to the elasticity of the paper-calender is not crushed, being in consequence much stronger and cleaner looking. For these reasons the use of the super-calenders is preferable to that of the chilled rolls where a high finish is desired.

In the mechanical preparation of paper stock many minor improvements have been made, such as cutting the rags by machinery, boiling the stock in close rotary or stationary boilers under pressure, and the use of the revolving washing-cylinder for removing the dirty water from the washing-engine. Notwithstanding all modern improvements, the pulp for the finest paper exhibited was prepared in the old beating-engine, substantially the same machine as that invented in Holland in 1750. This engine did not come into general use for many years after its invention, probably not over a hundred years ago, and during all this time its principle has remained unchanged. It is true that in the United States two patent finishing-engines, the Jordan and the Kingsland, have been put into successful operation within the last twenty-five years in many book- and news-mills, and are doing good service in brushing out and finishing the pulp for the machine, yet the preparatory process of washing and reducing to half stuff is still done by the old Holland engine. The Gould Patent Beating-Engine, exhibited by the Holyoke Machine Company, is of the same class as the two above mentioned, but is constructed on quite a different principle. It has been in operation about three

years, and as yet has been used only for reducing half stuff to pulp, but it approaches more nearly to a substitute for the old Hollander than either of the others. In its gearing and washing facilities it can still be improved, but it may be classed in the line of progress.

The paper-machine exhibited by the Gavit Paper-Machine Works of Philadelphia, which was in almost constant operation during the Exhibition, is strong and well built. It contains many improvements, and can claim to be in the front rank of first-class paper-machinery.

One very important discovery was made about a hundred years ago,—1774,—the use of chlorine gas as a bleaching agent. It was many years before its use became general, the first patent being issued in 1795. This has been of very great benefit to paper-manufacturers. By means of it the range of materials for paper stock has been largely increased, as it enables a good white pulp to be obtained from many substances that otherwise could not be used.

CAUSTIC ALKALIES.

It has been, however, within the last thirty years that one of the most important of all changes in paper-manufacture has been made,—the use of caustic alkalies for subduing various vegetable fibres, as straw, wood, esparto, jute, and many others of like kind. The great increase in the demand for paper has for many years past made the question of material a very serious one for paper-manufacturers. The supply of rags, or materials partially reduced in other manufactures, was not sufficient to meet the demand, and it became necessary to find some raw fibre that could be used wholly or in part, while some agent was needed that would thoroughly disintegrate without destroying them. The use of caustic alkalies has accomplished this, and has already largely increased the supply of paper material. As the fibres of different countries become better known, it would seem to place an almost unlimited supply at the disposal of the paper-manufacturer of the future. In fact, it is yearly becoming more evident that it is upon such agents as are necessary for subduing raw fibre the manufacturer must eventually depend for a supply of material. From 1858 to 1866, inclusive, there were issued in England alone 139 patents "for the use of alkalies for cleansing, disintegrating, scouring, neutralizing, etc." In the patents issued from the United States Patent Office during the same time, caustic alkali is used almost exclusively for the purpose of disintegration, nor have more recent investigations found any agent to take its place.

In the United States, straw-pulp, prepared by caustic alkalies, is used to a very great extent, even in fine grades of book-paper. Three

years ago the consumption of straw for white paper was over one hundred and fifty tons per day, producing between fifty and sixty tons of straw pulp. Owing to the depression in the paper trade, and the cheapness of other stock, not more than one-half as much is used at the present time. In connection with the use of straw and similar substances, it may be well to mention a mill that has been invented by Lahousse, of France, for disintegrating and bleaching these substances. The mill itself consists of a pair of sandstones, dressed and run like a pair of mill-burrs. The straw is first boiled under pressure in caustic alkali, and after being cleansed by washing is mixed with the bleaching liquor. A continuous stream of this pulp is then fed to the mill, the stones running at the rate of two hundred and fifty revolutions a minute. While passing through the mill, a double object is accomplished: the knots and joints in the straw are thoroughly disintegrated, and the pulp mixed with the bleaching liquor, and at the same time the friction of the stones raises the temperature to about ninety-eight degrees Fahr., at which temperature the chlorine gas is set free, and acts most advantageously upon the stock. It is the most effective machine of its kind in use. At present over sixty mills on the continent have it in active operation.

A large amount of chemically-prepared wood-pulp is also used in the United States. About ten years ago a stock company was organized which built the American Wood Paper Pulp Works at Manayunk, now a part of Philadelphia, for the manufacture of chemically-prepared wood-pulp. The works are the largest of their kind in the world, and cost $500,000. They have been in successful operation from the start, and produce fifteen tons of dry white pulp per day. Mr. Bloomfield H. Moore, of Philadelphia, who leased these works and uses their products, exhibited a beautiful line of book- and plate-papers, largely composed of this pulp. These papers have a fine finish, and take an elegant impression. Several other mills in the country manufacture chemically-prepared wood-pulp. The aggregate amount produced daily in the United States is not less than thirty tons.

In the last few years several improvements have been introduced in the manufacture of wood- and straw-pulp, two of which are worthy of special mention:

1st. A complete circulation of the caustic liquor through the stock while boiling under pressure, also heating the liquor up to a high temperature, and expanding it before percolating the stock. This imparts the heat to the stock, and softens the intercellulose while passing through it. At the same time a separation of the non-fibrous substance from the stock is effected by the current or circulating

liquor. The operation of this apparatus is as follows: An upright boiler is filled with stock, and a sufficient amount of caustic liquor is added. A cock is opened, and the liquor is allowed to flow through a perforated false bottom in the boiler into a centrifugal pump, which forces the liquor through a coil of pipe in a steam-drum, and then in at the top of the boiler and through the stock; the steam and hot water in the drum heat and expand the liquor, while the pump keeps up a complete circulation during the boiling.

2d. The other improvement mentioned operates as follows: Attached to the bottom of a stationary boiler is a disintegrator or grinding-machine, constructed on the same plan as a Jordan engine. The stock from the boiler passes into this disintegrator while under pressure, where it is crushed, and all particles of the fibre are brought into contact with the hot liquor. From the disintegrator the stock passes into a pump which forces it into the top of the boiler. By this means a complete circulation is kept up, and the stock, passing through the disintegrator, is thoroughly crushed and separated, enabling the liquor to act directly upon the intercellulose without weakening the fibre.

In 1853, Richard A. Brooman obtained in England a patent for the reduction of wood to a fibrous pulp by mechanical agents. In his specifications he says: "The machinery consists of a millstone or millstones, or metal rollers, cylinders or rasps, with roughened surfaces, which are caused to act upon blocks or pieces of wood, held in a frame always in the direction of the grain thereof," a current of water being directed on to the reducing agent "before its contact with the wood." Henry Voelter, a German, improved this machine and introduced its product, which is known as mechanically-prepared wood-pulp, into Europe and America. Other machines have since been invented for the same purpose and applied in this country. During the last ten years this kind of paper stock has come into general use both in America and in Europe for the lower grades of book- and news-paper. It has greatly cheapened the production of paper, and answers the public wants for every-day purposes. It is much to be regretted, however, that the natural saps contained in the wood—it being used in its green state—are very detrimental to the durability of the paper, particularly when it is excluded from the air between the covers of a book. Books and newspapers printed upon such paper will in time mould and decay; hence books intended to record the world's progress for the use of future generations, or even newspapers that are filed away in libraries, should not be printed on such paper.

The improvement in the use of imperfections or old printed and written paper has been very great in the last fifteen years, probably more than in the sixty years from the time when Matthias Koops first practically used them for making white papers in 1801. It is mainly to Americans that the world is indebted for the utilization of this waste product. During our civil war paper stock became so dear that American manufacturers were forced to work over old paper in order to keep their mills running. This was done by boiling the old papers in a solution of alkali, to destroy the ink, and then piling them up to drain for several days preparatory to washing out the ink. They were then repulped, bleached, and mixed with other stock. There are at least one hundred and fifty tons of this stock used in the United States per day.

As before said, it has for many years been a serious question with paper-manufacturers how they shall procure sufficient suitable material to meet the continually-increasing demand of the trade. European manufacturers are beginning to feel a need that the manufacturers of the United States have long felt, namely, a sufficient quantity of linen rags. In the United States the abundance and cheapness of cotton goods have prevented the use of linen to any great extent, especially as only a very small amount is manufactured in the country. Of late years the same is becoming the case in Europe. Even in flax-growing districts, the high price of labor has made it more profitable for the working-classes to buy the cotton goods manufactured by England, Russia, and the United States than to wear the home-spun linen, as was formerly the custom. In consequence of this, a comparatively small amount of linen is worn by the lower orders, and only the finer grades are made to any great extent. Moreover, the great improvement in machinery has made it possible to manufacture a better cloth from inferior material, as the paper-maker finds to his sorrow when the various processes of the mill have taken away all adventitious aids to improvement. It is in consequence of this need for more abundant and better stock that so many experiments have been made with different substances. Here let me say that it would be wise for such experimenters first to find out if others have not already gone over the ground. Many spend time and money in perfecting processes of which the utility or inutility has been proven long before by other persons.

In view of this great and growing need, it is encouraging to know with what a lavish hand nature has scattered her treasures of fibrous substances, so bountifully indeed that it would seem, with chemistry and mechanical skill aiding us, no demand could ever possibly equal

the supply. In all tropical countries, both of the Eastern and Western Hemispheres, the number and variety of fibrous plants are truly wonderful. In fact, all tropical plants are fibrous to a greater or less extent. More wonderful still is the small use that has been made of these plants, when the demand for them has been yearly increasing, not only for paper-manufacturers, but for manufacturers of textile materials. In many of these countries, large quantities are yearly gathered, and after serving some local purpose are thrown away as useless.

THE FIBRE EXHIBITS.

A slight glance at the fibre plants exhibited by different countries may not be uninteresting, even if they can be used directly only for textile purposes. Indirectly they will increase the paper-maker's supply of material, for after having gone through the previous process of manufacture for a textile fabric they are available for paper stock.

To give a detailed account of the fibres of each country is unnecessary, as many of them are common to several countries, sometimes in both the Eastern and the Western Hemisphere. In Mexico, Central America, the West Indies, and the northern countries of South America, the majority of fibrous plants, if not exactly the same, belong to the same great families. Those most fruitful in fibres are the Agaves, sometimes called Aloes, a sub-tribe of the order Amyrillideæ; the Bromelias, or pineapples, of the order Bromeliaceæ; the Musa, or bananas and plantains; and the Palm family, with a few varieties of the orders Liliaceæ and Malvaceæ.

The Agaves are indigenous to the American continent and islands from Virginia to Paraguay, but they flourish so abundantly in Central and South America, Mexico, and the West Indies, that it would seem an almost unlimited supply of fibre might be obtained from them. Of this family the most valuable varieties are the *Agave Americana*, *Agave Mexicana*, and *Agave Sisilana*. The *Agave Americana* grows with great abundance in all parts of tropical America, and has been introduced with success into various countries of the Old World. The fibre-producing properties of this plant are too well known to need much comment here, and it is only necessary to add that the better we become acquainted with it the more apparent its value becomes. It has long been used as a paper material, and is well adapted to the manufacture of cigarette-paper, as the fibre is very strong and burns with very little smell. Samples of this fibre were exhibited from Mexico, Brazil, Jamaica, Bermuda, and the Bahama

islands, and also from Egypt, Hindostan, and Australia, showing the wide range of country in which it may be cultivated.

The *Agave Mexicana* is indigenous to Mexico, where it is cultivated for the manufacture of pulque, a fermented liquor made from its juice. It is by many confounded with *Agave Americana*, but is an entirely distinct plant. It is especially interesting for the fibre obtained from its leaves, which is used for a var ety of purposes. The State Government of Hidalgo, Mexico, exhibited a most interesting case containing specimens of this fibre and the different articles manufactured from the plant. There were ropes and cordage, fine woven goods, nets, bottles of the clear, golden-hued pulque, and other products, as gum, honey, sugar, etc. Especially deserving of mention was the paper, both on account of the quality of the goods and the cheapness of the material. This paper is remarkable for its strength; in fact, it is so much esteemed for its toughness and durability that in 1830 a law was passed by the Mexican Congress requiring that all laws should be recorded upon it, and that it should be used for legal documents. Paper made from the *Agave Mexicana*, worthy of particular mention for its elasticity and strength, was also exhibited from the Belem mill of Messrs. Benfield, Braker, & Co., situated in the District of Mexico. In ancient times the native Mexicans used the leaves of this plant for paper in the same way as the Egyptians did the papyrus. The abundance and cheapness of this fibre certainly commend it to more particular attention. As the fibre is really the waste product, it could be procured at very small cost.

The *Agave Sisilana* is the plant popularly known as Sisal hemp, the cultivation of which was introduced into Florida, where it flourished for several years. It is a native of Yucatan, Mexico, where it is called Henequen. Its cultivation and utilization are yearly increasing, and its fibre is especially valuable for ship-cables, as it possesses the property of resisting the action of sea-water. Large quantities are exported to England for this purpose. It is also used as a paper material, but is not so well suited to this purpose as some others of the Agave family on account of the harshness of the fibre. Some very fine specimens of this fibre were exhibited by the State Government of Yucatan.

The whole family of Agaves are rich in fibre for paper-making, are produced in large quantities in their native countries,—sometimes in situations where nothing else will grow,—are easily gathered at small cost, and there seems no reason why they should not be utilized for the manufacture of various kinds of paper. The great trouble in

their native habitats has been a want of skill in separating the fibre, as well as a proper appreciation of their real value.

Next to the Agaves may be ranked the Bromelias, or pineapples, well known for their silky fibres. The order to which these belong, Bromeliaceæ, is peculiar to tropical America, but their cultivation has been successfully introduced into several parts of the Old World. It is from one species that the beautiful textile material known in commerce as piña is manufactured. Of this family, one of the most useful varieties as a fibre-producing plant is the *Bromelia sylvestris*, known in Mexico as the istle, and in Central America as the pita. It is self-propagating, and in the latter country it increases to such an extent in the forests that it is often a serious hindrance to the passage through them. Bromelias grow also in South America and the various West India islands, from some of which specimens were exhibited. The State Government of Oaxaca, Mexico, exhibited a variety of fibres obtained from different species, one of which was over three yards in length. Some of these were remarkable for their strength, and were produced in every degree of fineness. Like the Agaves, one great bar to their use has been the want of proper machinery for separating the fibre. Many who have tried these fibres say that they are equal to flax. They are sometimes used by the natives for the manufacture of paper, for mats, cordage, ropes, etc. From all that can be learned of their properties, they seem well worthy the attention of paper-makers as a staple paper material.

The different varieties of the Musa, or bananas and plantains, which are indigenous to the continent and islands of tropical America, also furnish a good, strong fibre in great abundance. In reference to these plants it must be remembered that the tree is invariably cut down when the fruit is gathered, and almost as invariably allowed to rot away. It is the fibre of the Musa family that is said to be the nearest approach to hemp or flax, and both writing- and wrapping-paper of good quality were manufactured from it several years ago in Demerara, British Guiana. Here, too, the want of proper machinery has prevented the use of the plants to any great extent. They are of rapid growth, very prolific, and easily cultivated, and the fibrous material is the part that is generally thrown away to waste. Samples of this fibre were exhibited from the British West Indian possessions.

In Central America, the northern countries of South America, and the West India islands many varieties of the palm-tree family are found. They all produce valuable fibre, which by the use of proper machinery might be available for textile purposes. Hooker says of

this family, that "all palms yield textile fibres, useful especially for the manufacture of paper." From the *Attalea funifera*, it is said that nearly all the cordage used on the Amazon River is obtained. A few specimens of this fibre were exhibited from Brazil, as were also samples of different varieties of palm from some of the West India islands. These palm fibres are very valuable to the natives, and are used by them for a great variety of purposes. The species are almost innumerable, there being "over twenty-three varieties producing fruit, cordage, fibre, oil, and even spirits."

The order Malvaceæ produces most valuable fibres in both hemispheres. It is to this family that the well-known Indian hemp belongs, which grows abundantly in tropical America as well as in India. One variety, known as the Mohant-tree, *Hibiscus arboreus*, produces a white fibre apparently well adapted for paper-making. It grows abundantly along the coasts of Central America. Another variety, known in the United States as the okra, is thought to be capable of producing valuable fibre under favorable circumstances. In Cuba this grows freely in all kinds of soil. Samples of this okra fibre were exhibited from Jamaica. The Society of Natural History of the City of Mexico exhibited specimens of mallow fibre, or wild silk as it is sometimes called. Several varieties grow in Mexico, and are noted for their soft and silky, yet tough fibres. They can probably be utilized for a textile material, and hence, indirectly, for paper stock.

The order Liliaceæ includes a large range of plants, many of which are cultivated only for ornament, but to it belong many valuable fibre-producing plants, among which may be named the different species of Yuccas. In America, several varieties of Yucca are found, some of them even as far north as the Missouri River, in the United States. These are known by several local names, as Adam's needles, Spanish bayonet, bears' grass, etc. No effort has ever been made in this country to utilize them for textile purposes, but it would seem well worth a trial. They grow in the poorest soils, and could be raised in many parts of the United States. In other countries, good ropes have been made from the coarser fibres, and a fine cloth resembling linen from the selected ones. The only sample of this fibre exhibited from America was from Jamaica, from which a specimen of the *Yucca aloifolia* was sent.

Of course the fibrous plants belonging to these orders are not, by any means, all that are found in America, but these have been referred to as being the most valuable. The exhibit of fibres from Jamaica was very fine, and included, in addition to those already mentioned, *Bœhmeria nivea*, or China grass, which has been successfully natu-

ralized; *Agave Sisilana; Ananassa sativa* and *Bromelia penguin*, both varieties of the pineapple family; two varieties of the Musa family; the naturalized Indian plants *Calatropis gigantea*, or yercum, and *Sanseviera Zeylanica*, or bow-string hemp, of which a description is given in the East Indian exhibit; two varieties of *Pandanaceæ*, or screw pine; palm fibres obtained from the leaf-stalks of *Caryota urens;* coir from the husk of the cocoanut; horsehair-like fibre from the sheaths of the *Arenga saccharifera;* and several varieties of mallow, some of which grow wild in profusion.

From the Argentine Republic, several samples of "caraguata," or "chaguar" fibre were sent. For many purposes it is said to be equal to hemp or flax. It grows in almost inexhaustible quantities, and yet has never been exported for a textile material. In the same country a species of cactus that grows very abundantly is said to furnish an excellent raw material for paper-manufacture; also a kind of grass very much resembling the esparto of the Eastern World.

Among the fibres exhibited from Brazil were several specimens prepared by Mr. S. L. da C. Leite, of the Province of Minas Geraes, two of which were especially remarkable. One, the fibre of a plant belonging to the order Asclepiadaceæ, or milk-weed family, is noticeable for its admirable whiteness and unusual tenacity. The plant grows spontaneously in the country, and has also been successfully cultivated. It has been already woven into textile fabrics, but its value as a paper material remains to be tried. It is said to resemble jute. The other was a specimen of natural paper produced from a species of fig-tree, *Ficus speciosus*. The trunk leaves are soaked in water and then passed between iron rollers, and, coming out very thin, are used for writing-paper without other preparation. Mr. Leite also exhibited fibres from a reed belonging to the order Malpighiaceæ, which is peculiar to southern tropical America, and one variety of palm fibre. There were also sent from the various Brazilian Provinces several other specimens of fibre. Among these may be mentioned as belonging especially to southern tropical America, *Bertholetia excelsa*, a variety of the order Myrtaceæ; two species of *Xilopia*, known locally as white and red embira; and a third, *Xilopia sericea*, noted for its wide, long fibres, which are highly esteemed for various fabrics; *Cecropia pellata*, used for woven fabrics, and belonging to the Urticeæ; *Copaifera*, well known for its medicinal gum, but also valuable for fibre; and *Bilbergia tinctoria*, a species of Bromeliaceæ, so called from the yellow dye extracted from it. There were very few specimens of palm fibre, of which there are so many varieties in Brazil. Of these the most valuable were the *Attalea funifera*, already

mentioned, and *Bactris*, also called tecun, said to be finer and more tenacious than hemp.

In many parts of tropical America fibrous plants of the Eastern Hemisphere have been naturalized, and seem to flourish as well as in their native habitats. It would seem that the great demand for textile substances might be met near home, if only advantage were taken of the materials so bountifully supplied. It might be said to American manufacturers, as was several years ago said to those of England, that "there is no want of material in every way adapted to the manufacture of paper, and paper-makers would soon find it to their interest to turn their attention to some of it instead of spending their time in futile attempts to induce foreign countries to supply them with rags."

In closing the list of fibres in the exhibit from the Western Hemisphere, mention must be made of a sample of asbestos fibre, prepared by J. S. Rosenthal, of Philadelphia. This mineral is well known for its long, silky fibres, which have the power of completely resisting the action of heat. In consequence of this latter property many attempts have been made to use asbestos as a material for the manufacture of fire-proof paper, but never very successfully, on account of the difficulty of separating the foreign matters. Mr. Rosenthal has invented a method of disintegrating asbestos fibre which seems more successful than any preceding one. The asbestos is put into wooden tanks lined with lead; it is then covered with water, and the chemicals are added. After the introduction of steam it is boiled from four to six hours. When disintegrated it is passed through a pair of rolls, the top one covered with rubber and a rubber apron running on the lower one, by means of which the water is driven from the fibre. It is then dried and manufactured into board on a machine especially constructed for the purpose. Mr. Rosenthal exhibited specimens of board made from this fibre from one-eighth to three-fourths of an inch in thickness. This board is used in packing steam-joints, covering steam-boilers, and in the manufacture of asbestos packing for steam-engines. He also exhibited some samples of paper made from the asbestos fibre, which, while not possessing sufficient strength or smoothness for writing-paper, showed great progress toward the production of a fire-proof paper.

Passing from the Western to the Eastern world, we come to countries where it would seem that centuries of occupation had scarcely left anything to be discovered, and yet here, too, there is much to be learned in regard to utilizing the material so abundantly furnished.

In the Eastern Hemisphere, the plants belonging to the orders

Urticeæ, Malvaceæ, Liliaceæ, and Tiliaceæ are more valuable for their fibre than in the Western Hemisphere; and some varieties of the orders Pandanaceæ, Leguminoseæ, and others, of which there are so few specimens in the New World, are valuable additions to fibrous plants. Here we find valuable specimens of the Musa and Palm-tree families. In the Egyptian exhibit especially were several specimens of fibre from the different varieties of palm. The date-palm is indigenous to Egypt, and flourishes both on the borders of the desert and in the cultivated ground. Textile fibres are obtained from the leaflets, spathe, flower-stalk, trunk, and root. There were several samples of fibre prepared from different varieties of bananas, and also from different water-reeds growing in the numerous canals of the Nile in Lower Egypt. From one of these latter, *Cyperus dives*, called diss by the Arabs, it is said an abundance of good paper material can be obtained. The well-known cat-tail, *Typha latifolia*, also grows in great profusion, and some good specimens of its fibre were exhibited.

India has long been celebrated as a country where almost every variety of fibrous substance is produced, and an enumeration of these would be like the rehearsal of an oft-told tale. But with all that has been said and written of them, their real value as textile materials is scarcely realized even now, though of late years some have come into more general use. The exhibit of fibres from the British East India possessions contained over forty different specimens, belonging to nearly all the fibre-producing families, most of them native to the country, some naturalized. Of the order Urticeæ, or the nettle family, there were several specimens, beginning with the well-known China grass or Rhea fibre, and including several specimens native to the country. Among these may be named the Neilgherry nettle, *Urtica heterophylla;* puyba fibre, *Bœhmeria puoya*, sometimes called puya flax; and Kangra hemp, *Cannabis sativa.* Of this family of plants there is an almost unlimited supply in India, many varieties growing in great profusion along the base of the Himalaya Mountains from Assam to Sutledge. A proper mode of treatment seems to be all that is necessary to render them of great value as textile and paper-making materials. Of the order Malvaceæ we find barriala from Bengal, *Sida rhomboida*, which very much resembles jute in appearance, and for some purposes is said to be superior; the "brown hemp" of Bombay, *Hibiscus cannabinus*, which is used for cordage, sackcloth, and paper; Indian mallow, *Abutilon Indicum;* and Roselle, *Hibiscus sabdariffa.* The varieties of this family differ very much in appearance, but nearly all of them are valuable for their fibre-producing qualities, and, as they grow in great abundance, are worthy of atten-

tion. From the order Liliaceæ were specimens of *Sanseviera Zeylanica*, familiarly known as bow-string hemp, which grows wild under the bushes in the jungles, is very abundant and very strong; and the *Yucca gloriosa*, Adam's needle, which has already been mentioned among American fibres. One specimen of the order Asclepiadaceæ, *Calotropis gigantea*, Yercumnar, also a jungle plant, is said to be one of the most tenacious fibres known, and is much used in Bengal and Madras for the manufacture of strong cloths, cambrics, and lawns. This fibre grows very abundantly without any special care. It is known sometimes as mudar silk cotton. Of the fibres of leguminous plants exhibited, two are especially worthy of mention,—one the Sunn hemp, *Crotalaria juncea*, said to be a valuable substitute for Russian hemp; and Jubbulpore hemp, *Crotalaria tenuifolia*. The former is a well-known article of commerce, the latter only lately coming into use, and employed for the manufacture of rope.

In addition to these fibres were several varieties of palm fibres, musa fibres, agaves, bromelias, screw pines, and different species of mat-grass and flax; but only one of special interest to paper-makers remains to be mentioned, namely, jute, *Corchorus olitorius*, which belongs to the order Tiliaceæ, or the lime-tree family. This fibre has for many years been an article of commerce, and attention is called to it from the fact that it is capable of being used by paper-makers for a much greater variety and finer grade of paper than at present. Under proper treatment a fine white fibre can be obtained from it at less cost than from the materials generally used for the manufacture of the finer grades of paper. Jute-culture has been introduced into America within the last few years. It is cultivated with great advantage in the neighborhood of cotton-fields, as it requires the same soil and climate. It is said that when the cotton-fields are belted with jute it serves as a protection against the ravages of the caterpillar.

Many of the fibres in the Indian exhibit have never been tried as paper materials, and at present could be made use of only indirectly; but the great trouble has been want of proper treatment. In order to utilize them to their full extent, it is necessary to disintegrate them thoroughly, and at the same time keep unimpaired the strength of the fibre and its capability of being properly bleached. This once accomplished, the want of material need never trouble the manufacturer.

One of the most complete exhibits of paper fibres made was a collection of samples prepared by the director of the Botanical Gardens at Melbourne, Victoria, Australia. In this collection sixty-nine fibrous plants were represented, some by the raw fibre, some by paper manufactured from them, and others by both the fibre and the paper.

Two-thirds of the plants were natives of Australia; the other third had been naturalized. There were about forty specimens of paper.

First on the list of native Australian fibres comes a variety of the well-known order Urticeæ, or nettle family, the grass-cloth-tree of Queensland, *Pipturus propinquus*. From the bark of this tree a good fibre is obtained, which is used in the manufacture of paper. Accompanying the fibre was a sample of the paper made from it. Another variety of the order Urticeæ is the tree-nettle of Queensland, *Laportea gigas*. The fibre exhibited was prepared from the bark of this tree, which sometimes attains a height of eighty or one hundred feet. The wood of this tree is also fibrous and might be used in the manufacture of paper. The natives use the fibre obtained from the bark and roots for fishing-lines and nets. From still another variety of this family, the native nettle, *Urtica incisa*, a very good sample of paper was made. The pulp obtained from this plant is of a very fine texture, becomes a beautiful white color when bleached, and seems well suited to the manufacture of paper. There were also samples of paper and fibre from the paper mulberry, *Broussonetea papyrifera*, and China grass, *Bœhmeria nivea*, both members of the order Urticeæ, but too well known to need further comment here.

From plants of the order Malvaceæ were several specimens. First of these may be mentioned *Langunaria Patersoni*, the cowitch-tree of Norfolk Island, which is also indigenous to Queensland. The fibre obtained from the bark is fine, strong, and glossy, and can be used in the manufacture of a good grade of paper, as the sample accompanying it showed. From the bark of the Queensland hemp, *Sida retusa*, was a sample of good, strong fibre, suitable for the manufacture of paper, twine, etc. There was also a sample from the bark of Victorian hemp, *Sida pulchella*, a small shrubby tree, growing abundantly on various rivers in Victoria. It yields a fine bast, from which a strong fibre is obtained, suitable for paper and various purposes. From the hollyhock-tree of Queensland and New South Wales, *Hibiscus splendens*, were samples both of fibre and paper. This is an ornamental shrub, or small tree, but its bark is very rich in fibre suitable for paper and other purposes. Native to the same districts is the *Hibiscus heterophyllus*, from whose bark a quantity of good fibre is obtained suitable for the manufacture of paper, as was seen from the specimens exhibited. In addition to these native fibres were several specimens of the same order from South American plants naturalized. Among these were *Abutilon venosum*, *Abutilon mollis*, *Abutilon Bedfordianum*, and *Abutilon striatum*. The bark of all of these plants yields a quantity of fine fibre, which is said to be a good paper material.

From New Zealand was one specimen of the same family obtained from the bark of the ribbon-tree or lace-bark, *Plagianthus betulinus*. The bark of this tree is of a lace-like texture, and the fibre is very strong.

The largest number of Australian paper-fibre specimens was obtained from plants of the order Cyperaceæ. Many of these are familiarly known as rushes, or sedges, and are usually found near water-courses or lagoons. Among these may be mentioned the following: *Scirpus fluviatilis*, a species of club-rush of prolific growth, yielding an abundant supply of material for writing-, printing-, and packing-paper; a sample of this paper was also exhibited. *Carex appressa*, a sedge grass, which is also found in great abundance. The fibre is of strong, coarse texture, judging from the sample of paper, but with proper treatment it might be used for a finer grade of paper. *Cyperus lucidus*, the shining gallingall rush, which, like the plant mentioned above, grows very plentifully near water-courses, and can be readily gathered in paying quantities. It yields a large proportion of fibre of good quality, from which a strong packing-paper is made, as shown by the sample; but it might also be used for finer paper, if properly prepared. *Carex pseudo-cyperus* is often found growing with *Carex appressa*, but not in sufficient quantities to be practically available, although it is a good paper material, as the sample exhibited showed. *Gahnia psittacorum* is a kind of sword-grass, the leaves of which often attain a length of twelve feet. The paper made from this plant proves its value as a paper material, and the quantities in which it grows and the ease with which it is gathered make it practically available. *Cyperus vaginatus* grows in large quantities in sub-alpine situations. The paper exhibited was prepared from the stems and leaves, which yield a pulp suitable for writing-, printing-, and packing-paper. Paper was also exhibited manufactured from the stems and leaves of another species of sword-grass, *Lepidosperma elatius*. This plant attains its greatest perfection near water-courses in sub-alpine situations, where the leaves sometimes grow to be nine feet in length. It can be obtained in large quantities, and yields a strong fibre. The coast sword-rush, *Lepidosperma gladiatum*, grows very abundantly in barren, sandy soil, all along the coast-line. This is said to furnish one of the best fibres for paper-making that is found in Australia. Samples of paper made from this fibre attracted much attention in previous Exhibitions, and were also shown in the present one. Somewhat similar to this is the *Lepidosperma flexuosa*, slender sword-rush, known as mat-grass. It grows very plentifully in low-lying, swampy ground, and furnishes a strong fibre for paper-making. The

fibre prepared from *Cladium radula*, black reed or cutting grass, is strong, of good quality, and suitable for a paper material. This grass grows in great abundance in rich land, and can be obtained in any quantity.

Several fibres were exhibited obtained from plants belonging to the order Myrtaceæ. One of the most singular of these plants is the *Eucalyptus obliqua*, or stringy-bark-tree, as it is called by the colonists. The bark of this tree yields an extraordinary amount of fibre, and as it grows to an immense height and size, the diameter being sometimes ten feet or more, an almost unlimited supply can be obtained from it. The fibre is too harsh to use alone in paper-making, as the sample showed, but is of value when mixed with other material. The same may be said of the *Eucalyptus fissilis*, the messmate of the settlers. The paper prepared from the bark of the *Melaleuca ericifolia*, swamp-tea-tree, is very soft, and well suited for blotting-paper, on account of its absorbent qualities. This bark is easily obtained, and can be had in considerable quantities. These qualities belong to nearly all the varieties of Melaleucas. Paper from two other varieties, *Melaleuca genistifolia* and *Melaleuca squarosa*, was also exhibited.

From the order Sterculiaceæ the following valuable fibres were exhibited: From the bark of *Sterculia acerifolia*, the flame-tree of New South Wales, both fibre and bast. The bark on this tree is fully two inches in thickness, and the bast obtained from it is of a very fine, lace-like texture. The fibre is prepared by a very simple steeping process. From *Sterculia diversifolia*, the Victorian bottle-tree, a bast is obtained in large quantities, somewhat similar to the preceding, but coarser and darker in color. It is prepared in the same manner, as is also the fibre obtained from the bark of *Sterculia lucida*, a tree very much resembling the first named. The fibre from all of these barks is a good paper material. From the Queensland bottle-tree, *Sterculia rupestris*, a strong fibre is obtained suitable for paper-making. Another of the same family, *Commersonia Fraseri*, tie-plant, a tall-growing shrub, produces a bark that is extensively used by the settlers as a tying material. The fibre is fine, and can be obtained in large quantities. *Sterculia fœtida*, also a native of the Indian and Malayan peninsulas, produces a good, strong fibre. In addition to the native fibres belonging to this family was an African one naturalized, *Dombeya Natalensis*, which produces a fibre suitable for paper-manufacture.

Of the order Gramineæ the three following specimens were exhibited: *Ehrharta tenacissima*, a wiry grass found growing on the uplands in large quantities, and furnishing material suitable for packing- and writing-paper; *Poa australis*, a rigid, erect-growing grass,

found principally near streams and in marshy places, and producing a good, strong fibre; and the *Arundo conspicua*, the Phune grass of New Zealand, from the leaves and stalks of which a good paper material is obtained. Paper also was exhibited made from these grasses.

From stems of plants of the order Juncagineæ, locally called rushes, four specimens were exhibited. *Isolepus nodosa*, a rush growing plentifully on river-banks and in marshy places; *Juncus maritimus*, the sea-coast rush, as its name indicates, found along the sea-coast and in salt-marshes; *Juncus vaginatus*, small-sheathed rush, and a larger variety of the same plant found along water-courses. All yield good paper material, particularly the last named, from which a large percentage of fibre is obtained.

Belonging to the order Liliaceæ, only two native fibres were exhibited. *Dianella latifolia* grows along the banks of creeks. In favorable situations its leaves, from which the fibre is obtained, grow to a length of six feet. Its growth is abundant and the yield of fibre large. *Dianella longifolia* somewhat resembles the former, but cannot be obtained in sufficient quantities to make its use profitable. Of naturalized fibres of this order were three varieties of Yucca from America, all noticeable for their strength. From the leaves of the famous dragon-tree of Teneriffe, *Dracæna Draco*, a strong, flexible fibre was exhibited, but as this tree grows very slowly, the fibre is not of practical use. This tree is remarkable for its prodigious longevity and immense size. The dragon-tree of Orotava is supposed to be the oldest plant on the globe, and its trunk is so large that ten men holding hands can scarcely reach around it. But the most valuable fibre plant of this order is *Phormium tenax*, or New Zealand flax, which very much resembles in appearance the Yuccas of America. This plant, as its name indicates, is a native of New Zealand, but its cultivation has been successfully introduced into Australia and a few other countries. Like its American relatives, the Yuccas already mentioned, it seems to flourish in almost any kind of soil, sandy, swampy, or rocky. Although not immediately productive, an almost unlimited supply of fibre can be obtained after a few years. A good paper material is obtained from it by a very simple process, but to obtain the finer fibres uninjured a more complicated process is necessary. The fibre is very strong, and produces a paper noticeable for its whiteness. This fibre is yearly coming into more general use for paper-making and textile purposes.

From the order Amaryllideæ three specimens were exhibited,—two from America, *Agave Americana* and *Fourcroya gigantea*. The

third, *Doryanthes excelsa*, spear lily, is a native of East Australia, and somewhat resembles the last-mentioned plant. Its leaves are one mass of strong fibre, which furnishes a good paper material.

In addition to these were specimens belonging to various orders, nearly all the plants being natives of Australia. From the native bulrush, *Typha angustifolia*, an abundant supply of material is obtained suitable for packing-paper, and apparently capable under favorable treatment of being made into the finer grades of paper. Fibre from the Jaggery palm, *Caryota urens*, which grows on the northeast coast of Australia, as well as in India, and also from *Pandanus utilis*, or screw pine. Paper from *Juncus pauciflorus*, which yields pulp suitable for fine paper, and also from a species of swamp moss. This latter material can be had in enormous quantities, as it completely covers the surface of the lagoons, and is easily gathered. It furnishes material from which a strong packing-paper is made. From *Xerotes longifolia*, the tussock grass of the colonists, a good packing-paper is also made. This grass grows abundantly, attains considerable length, and furnishes a large percentage of fibre. From the bark of *Pimelia axiflora*, the Currijong of the natives, were specimens of both fibre and paper. This plant is peculiar to extra-tropical Australia, and grows abundantly as underwood in the forests. It has a smooth, brown bark, very tough, and yielding a large amount of fibre suitable for paper of fine quality. Allied to this, but a native of South Africa, is *Dais cotinifolia*, from which also a specimen of paper was shown. The bark yields a good paper material of fine texture and white color. The plants of this order, Thymeleæ, all possess tenacious fibres. Of fibres naturalized from New Zealand were specimens of paper from *Pittosporum crassifolium*, and fibre from the leaves of a species of astelia. There were also fibres from two or three other naturalized plants, among which may be specially mentioned those prepared from the bark of *Sparmania Africana*. This fibre is of a fine silky texture and a beautiful silvery-white color. It is very easily prepared and suitable for textile fabrics, and hence indirectly available for paper stock. The plant produces two crops of canes a year, and they yield a large proportion of fibre.

In addition to the fibres exhibited from Victoria, there were also some from Queensland and New South Wales, but as they very much resembled those already mentioned, it is not necessary to give a further description of them.

In the Netherlands exhibit was quite a good display of fibres from their East Indian possessions, the most of them from the Botanical Museum at Biutenzorg, in the island of Java. These included dif-

ferent varieties of the Musæ, Malvaceæ, Urticeæ, Tiliaceæ, Sterculiaceæ, and others, all of which have been so fully described in the Indian and Australian exhibits that they do not need further mention here. These islands, like all this part of the world, are rich in fibrous plants, that need only to be known and properly treated to be valuable as textile materials.

The exhibit of fibres from China and Japan was small, both in number and variety. From China were several specimens of China grass and hemp, coir obtained from the outer covering of the cocoanut, and one specimen of pineapple hemp. The Japanese exhibit contained only specimens of jute, musa, and China grass, and two other varieties of nettle.

Spain exhibited several fibres, two of which, although well known, are worthy of especial mention. One, esparto grass, is a native of Spain; the other, *Musa textilis* or Manila hemp, is produced in its dependencies, the Philippine Islands. Esparto grass, known botanically as *Macrochola tenacissima*, belongs to the order Gramineæ. It is found in Spain on all the lands facing and bordering the Mediterranean, where this wild grass or sedge is almost the only plant produced in the barren soil, but it gradually disappears as the fertile interior is reached. It has been long used by the natives for the manufacture of mats, baskets, etc., quite a trade being carried on in these articles. About fifteen years ago the scarcity of paper material in England induced paper-manufacturers to make the experiment of using esparto. As it proved a success, its use as paper stock has continued ever since, and now large quantities are consumed in England, France, and Belgium for this purpose. When used as paper material almost any quality can be employed, and hence only the wild grass has been manufactured into paper. Of late years the plant has been cultivated, which greatly improves it as a textile material; and it is now used in the manufacture of dress cloth, for some kinds of which it is said to be better adapted than cotton or flax. This cultivated esparto is much more valuable than the wild, which latter is rapidly decreasing in quantity from a careless method of gathering, and consequently it is yearly becoming less available for paper stock. A variety known as alfa grass, *Ligeum Spartium*, is indigenous to the opposite coast of Africa, but it is inferior in quality to the Spanish esparto.

The *Musa textilis*, from which the Manila hemp or Abaca of commerce is obtained, is the most valuable of all the musa family for its fibre-producing properties. In many respects its appearance differs entirely from other members of the musa family. The fibre is round,

silky-looking, and nearly white. It is also very long; one thread exhibited measured twelve feet eight inches. It is obtained from the petioles of the leaves, and is of different degrees of fineness, the fibre from the interior being much finer than the exterior fibre. Unlike other plants of this family, the *Musa textilis* is not allowed to blossom, as the fibre is much weakened in the process. The finer fibres are used for the manufacture of the most delicate tissues, the coarser for ropes, cordage, etc. In the manufacture of strong paper this fibre is one of the best substitutes for linen that has been found. The cultivation of the plant has been successfully introduced in some of the West India islands, and in India and the islands of the Indian Ocean it is said to grow as well as in its native islands. It is now one of the leading fibres of commerce, and the plants are cultivated on at least four hundred of the Philippine Islands. The whole of this Manila hemp produce is exported, the largest quantity to England, and some to the United States and Germany. Many samples of this fibre were on exhibition, not only from the Philippine Islands, but also from India, Mauritius, West Indies, etc.

There were also exhibited from Spain, fibres of palm, palmetto, junco, and nea, but the two latter of these have not yet been applied to paper stock.

In the Portuguese exhibit there was quite a fine display of flax and hemp, including many varieties in different stages of preparation. The fibres are too well known to claim attention here. From the African and Indian possessions of Portugal were several fibres that are almost unknown to commerce, and others that have been in use for some time. Among these latter may be mentioned pineapple filaments from Angola and Mozambique, Africa; banana fibre from Angola, where the plants grow spontaneously and in great abundance; and fibres from the leaves of the Dendem palm-tree from Cape Verd and Mozambique, Africa, and also from India. Among the plants that belong principally, if not entirely, to Africa, three may be especially mentioned. From the ife-tree, *Sanseviera Angolensis*, a native of Angola, a fibre is obtained which is used in the manufacture of cables and ropes. It is prepared very much in the same manner as flax. This tree belongs to the order Liliaceæ of the sub-tribe Alvineæ, which plants principally inhabit South Africa. Another fibre of tropical Africa is *Adansonia digitata*, baobab, called in Angola, whence the specimen was sent, imbondiero. This tree is remarkable for its size, and especially for the enormous thickness of the trunk, "the circumference being sometimes one hundred feet." It was formerly supposed that this tree grew very slowly and was very long lived, but the con-

trary is now known to be the fact. The fibre is obtained from the bark, is very strong, and is used for the manufacture of rope and also of coarse cloths, from which bags are made. From a plant of the order Asclepiadaceæ, called by the natives mundono, fibre is obtained that is used in Angola for the manufacture of a cloth which is a substitute for linen. From another plant, quiboca, a native of Angola, a fibre is obtained that very much resembles flax fibre in appearance. This plant frequently attains a height of over nine feet. The fibre is used for the manufacture of cloth and other articles. There were also several other fibres from Angola, among which those obtained from the following plants are worthy of mention: white and yellow quibori, quizunzo, quifuche, quifinei, and diolo. There were also quite a number from the Portuguese Indian possessions.

The exhibit of fibre in the British section was very large and complete, including as it did both East and West Indies and Australia, of which mention has already been made. Also included in this section was the exhibit of fibres from the Botanical Gardens in the island of Mauritius. The specimens numbered about fifty, and many of them well deserved mention. The specimens belonging to the musa family were more numerous than those of any other, and consisted of nine varieties. Some of these have already been described in other exhibits, as the musa textiles, *Musa paradisiaca*, and others; but *Strelitzia regina*, *Heliconia gigantæa*, and *Urania* (Ravenala) *Madagascariensis*, are new. *Strelitzia regina* is a native of South Africa, and *Heliconia gigantæa* of tropical America. *Ravenala Madagascariensis* is said to be the finest species of this family. Its popular name of travelers' tree is due to the reservoir of the leaf-sheaths, in which a limpid and fresh water collects, which may be obtained by pressing the base of the petiole. The pulpy aril of the seed, remarkable for its magnificent blue color, yields an abundant volatile oil. Like all of this family, the petioles of the leaves of these plants are formed of very tenacious fibres.

From the order Sterculiaceæ, in which so many of the Australian fibre plants were included, were several species, of which the following may be especially mentioned. Theobroma cacao is peculiar to America, but is cultivated in Asia and Africa. It is especially valuable for its seeds, from which are obtained a fixed and solid oil, called cacao butter, and other valuable products. There were also fibres from *Pterospermum acerifolium*, *Guazuma ulmifolia*, and *Melochia liliacefolia*, the last named belonging to South Africa.

Of palm fibres there were specimens from *Livistona mauritiana*, *Latania aurea*, *Sagus ruffia*, and *Sagus saccherifera*, the last two famil-

iarly known as sago palms. There were four specimens of the genus Sanseviera, order Liliaceæ, *S. zebrina*, *S. Zeylanica*, *S. latifolia*, and *S. cylindrica*, all of which abound in extremely fine textile fibres. Of the order Pandaneæ there was only one specimen, *Pandanus utilis*. This is somewhat singular, as the number of species of this order in Mauritius, where they are called vacaos, is a remarkable botanical feature of the island. Of the genus Fiscus, familiarly known as figs, there were four samples, all of which produce tenacious fibres similar to the Urticeæ. From the order Arvideæ were three specimens, *Colocasia antiquorum*, and two varieties of Caladium. The first named is a native of India, but from time immemorial has been cultivated by the Egyptians, and has spread all over the tropics. The varieties of Colocasia and Caladium are cultivated as ornamental plants for the size and elegance of the leaves. Of the genus Dracæna were two varieties, one belonging specially to Mauritius. Of the order Malvaceæ four varieties, and of Agaves from America three varieties, *A. Americana*, *A. Mexicana*, and *Fourcroya gigantea*.

Of miscellaneous plants the following may be mentioned: *Cordia myxa*, an Asiatic tree cultivated in very ancient times by the Egyptians for its medicinal properties; *Alpinia magnifica*, a plant which grows very abundantly in tropical Africa; *Ixora corylifolia*, of the order Rubiaceæ; and *Carludovica palmata*. This last-named plant belongs to the order Cyclantheæ, which grows exclusively in tropical America. *Carludovica* flourishes in the damp forests of Ecuador, Peru, and the United States of Colombia, South America. From the leaves a much-valued straw is obtained, which is used in the manufacture of Guayaquil or Panama hats. Many of these fibres have never been used as paper materials, but it would seem that some of them are worthy of a trial, especially those that are already extensively cultivated for other purposes. There was also a specimen of the well-known fibre plant *Bœhmeria nivea*, and also of a species of mulberry, *Morus tartarica*.

One exhibit of paper stock from England proper is deserving of mention. This was a case from the Ford Works Company, containing samples of esparto, rice-straw, maize, New Zealand flax, refuse sugar-cane, and bamboo. The samples were presented in different stages of preparation,—first in the natural state, then brown stock, then bleached half stuff, and finally in paper. The samples of paper were all clean and of good color. Among these samples those of the bamboo were especially noticeable. This has been used as a paper material for time out of mind by the Chinese and Japanese, but has never been utilized to any great extent by European manufacturers. If this

could be done it would furnish an almost unlimited supply of material. The *Bambusa vulgaris* is more generally distributed than any other variety, being found in abundance in both hemispheres. In India it grows in such profusion that it frequently forms impenetrable jungles, and in South America and the West Indies its cultivation has been successfully introduced. It is said that there are over one hundred and seventy varieties of bamboo, many of them familiarly known as canes, and wherever heat and moisture exist some species is generally found. In the United States some varieties are found in great abundance in what are locally known as cane-brakes, which are most frequent in the Southern States along river-banks and in swampy ground. Pulp manufactured from these canes has been in use for several years, three separate companies having been formed specially for its manufacture.

In the Belgian exhibit was a case of assorted paper stock sent by John Pfeffer. This consisted of eighty-four different grades, ranging from the finest white linen rags to samples of waste made up of old iron, broken glass, and old shoes. This exhibit showed a very good classification of paper stock. The exhibitor also claims that he is able to disinfect the stock by means of chemicals, so as to prevent any smell or danger from contagious diseases.

THE PAPER EXHIBITS.

It is to be regretted that the display of paper from the United States was not more complete. But very few of the numerous and extensive mills of the country were represented, and these were almost all Eastern establishments. This shows a very reprehensible indifference on the part of our manufacturers in regard to their present reputation and future business interest. However, the display, though small in quantity, was excellent in quality; in fact, the superiority of the leading exhibits was so marked that it seemed to leave nothing to be desired, and the excellence was so uniform that it is almost impossible to make any comparative report on standard American papers.

The exhibit of bond, ledger, and blank-book papers, of superfine linen for note-, letter-, and cap-papers, some of the latter in many tints, was superb, and not equaled by similar exhibits from other countries. The chromo, steel-plate, wood-cut, and book papers exhibited were very fine, and all that could be desired. The amount of blotting-paper displayed was small, but the quality was of the highest order. Of news-paper proper there was no exhibit, which is especially to be regretted, as the United States is a very large producer and consumer

of this grade of paper. Likewise, there was no exhibit of Manila paper proper, but the two or three exhibits of building-paper made from Manila stock were very good. Wrapping-paper was scarcely represented at all, and the display of card-board, Bristol-board, book-binders' and box-makers' board was very meagre, but of good quality. The two exhibits of tissue-paper were also of very good quality. Among the exhibits the following may be especially mentioned:

PORTER & BAINBRIDGE, *New York, N. Y.*

A large assortment of card stock of every description, and also a large variety of papers and envelopes of both foreign and domestic make.

RHODE ISLAND CARD-BOARD COMPANY, *Pawtucket, R. I.*

A variety of differently colored card-board, which was of good quality, possessing both hardness and elasticity.

W. O. DAVEY, *Jersey City, N. J.*

A lot of tar or binders' boards of excellent quality, the only display of the kind brought to my notice.

ZENAS CRANE, JR., *Dalton, Mass.*

White and tinted Bristol-boards of very good quality.

THE ANDROSCOGGIN PULP COMPANY, *Portland, Me.*

A good sample of wood-pulp, and also boxes made from the wood-pulp board. The boxes were not entered for competition, but were good of the kind.

CASE BROTHERS, *South Manchester, Conn.*

Press-boards, which were hard, strong, and of excellent quality, with the one exception that they were lumpy. A little more care in the preparation of the stock would have produced a No. 1 board.

MOUNT HOLLY PAPER COMPANY, *Mount Holly Springs, Pa.*

A small but very creditable display of ruled papers.

OWEN PAPER COMPANY, *Housatonic, Mass.*

One of the largest displays of writing-paper in the Exhibition, including a large line of their foreign correspondence, fancy rep, and drawing-paper. The papers were excellent in every point except sizing, which might have been better.

PARSONS PAPER COMPANY, *Holyoke, Mass.*

A good display of colored writing- and envelope-paper, which looked very well.

CRANE BROTHERS, *Westfield, Mass.*

Bank-ledger and record paper of excellent quality; also Japanese paper baskets and paper belting. These baskets are very good of their kind, and the belting can be used in a dry place. It is cheap and well made, and probably will do all that is claimed for it.

MEGARGEE BROTHERS, *Philadelphia, Pa.*

A good engine-sized paper, second quality, envelope-papers in all colors and shades, granite cover-papers, plate-papers, and assorted colored mediums.

JESSUP & MOORE, *Philadelphia, Pa.*

A very good line of copper-plate, lithograph, wood-cut, and super-calendered book-papers, all of which contained wood cellulose or chemically-prepared wood-pulp. They also exhibited printed samples of these papers, which looked very fine.

NASHUA CARD AND GLAZED PAPER COMPANY, *Nashua, N. H.*

Cut cards, a small lot of card-board stock, in sheets, and four or five rolls in colored stock. They also sent in a fine line of card-boards for examination, but as the goods were not on exhibition they could not be passed upon.

HURLBUT PAPER COMPANY, *South Lee, Mass.*

Several reams of flat and folded papers, very plain looking but of good quality.

WHITING PAPER COMPANY, *Holyoke, Mass.*

The finest paper display in the Exhibition. They exhibited about one hundred and seventy-five different styles of paper, put up in two hundred different styles of wrappers. Included in their display was a ream of the largest sheets of animal-sized, loft-dried paper ever made. It was six by eighteen feet, and from one ream of this paper five hundred thousand sheets of note-paper could be made.

JOSEPH PARKER, SON, & CO., *New Haven, Conn.*

About one hundred reams of their Treasury blotting-papers. These papers were the best of their kind on exhibition. They were tough,

possessed the necessary absorbing qualities in a high degree, and were of the first quality in every respect.

SEYMOUR PAPER COMPANY, *Windsor Locks, Conn.*

A large variety of cover and other colored papers, all of good quality.

BYRON WESTON, *Dalton, Mass.*

An elegant exhibit of first-class ledger-paper. There was no better paper in the Exhibition as to texture, strength, and finish.

CRANE & CO., *Dalton, Mass.*

Bank-note, bond, and parchment papers of excellent quality, strong, flexible, and well sized.

SOUTHWORTH COMPANY, *Mittineaque, Mass.*

A beautiful display of clean and well-made paper, consisting of bank-ledger and different kinds of writing-papers. They were the cleanest and best-woven papers in the Exhibition.

L. L. BROWN PAPER COMPANY, *South Adams, Mass.*

A fine exhibit of ledger-papers. They were not as well woven as some others, though exceedingly well sized.

H. V. BUTLER, JR., & CO., *Paterson, N. J.*

A variety of papers, among which their silk copying-paper was noticed as being very fine. They also exhibited in rolls animal-sized paper, which enables map publishers and others to use large sheets of paper without pasting them together.

TILESTON & HOLLINGSWORTH, *Boston, Mass.*

A fine line of chromo, steel-plate, wood-cut, and calendered plate-papers, the finest of their kind on exhibition.

CHAPIN & GOULD, *Springfield, Mass.*, and CARSON & BROWN PAPER COMPANY, *Dalton, Mass.*

A creditable display of their lines of goods, but no specialties.

DENNISON & CO., *Boston, Mass., and New York, N. Y.*

Among other articles, a very fine tissue-paper, called Excelsior colored tissue.

In addition to these, the Haldeman Paper Company, Lockland, Ohio, exhibited a large line of roofing-papers; George P. Tangeman & Co., Hamilton, Ohio, four rolls of carpet-paper; T. Seymour Scott & Bro.,

Philadelphia, carpet- and building-paper; Joseph Stelwagon & Son, Philadelphia, roofing- and felt-papers; James Guie & Sons, Downingtown, Pennsylvania, exhibited paper-wrappers of excellent quality.

The exhibits from foreign countries were not as full as was desirable. England was very poorly represented, there being only three exhibits made. One of these—that of Robert Fletcher & Son—contained the finest colored tissue in the Exhibition.

The display from France was also small. She excelled, however, in photograph-papers and cheap engine-sized writing-papers.

The display from Germany consisted chiefly of a low grade of paper made from wood-pulp, both chemically and mechanically prepared.

The Austrian exhibit was limited in quantity. It contained but one exhibit of writing-paper; the display of cigarette-paper was very good.

The best display of any foreign nation was that of Spain. Including a variety of paper, it excelled especially in cigarette-papers.

From Russia there was a good exhibit, especially of writing-paper, which was strong and well made.

Italy displayed some good samples of hand-made paper. It possessed strength, but lacked finish, and did not indicate any great degree of progress.

Sweden displayed the finest lot of wrapping-paper in the Exhibition, and also some very good samples of wood-pulp, both chemically and mechanically prepared.

The Mexican exhibit contained some very good paper made from native fibres. As mentioned above, that made from Agave fibre was the strongest paper in the Exhibition. Egypt also exhibited specimens of paper made from native fibres, which were of very fair quality.

The exhibit of papers from both China and Japan was very creditable. Their papers, however, are adapted to their own peculiar uses, and are so different from those of Europe that they can scarcely be compared with them.

There were also exhibits of paper from some other countries, but these were not of sufficient superiority to merit particular mention.

In concluding this report I desire to say that I have hardly done more than to outline the paper and paper-making exhibits, with the classes of fibres which can be utilized directly or indirectly in the production of paper. The field is wide and affords much room for study and investigation, which it is to be hoped will be given to it by men who are devoted to these interests, and I shall be glad if, in this review of the exhibits, I have been able to direct more earnest attention to a subject of so great importance.

REPORTS ON AWARDS.

GROUP XIII.

1. **A. W. Faber, Stein, near Nuremberg, Bavaria, Germany.**

LEAD PENCILS, ARTISTS' PENCILS, AND COLORED PENCILS.

Report.—Commended for excellence of quality and workmanship, and uniformity in the various grades.

2. **Schwanhäusser (formerly Grossberger & Kurz), Nuremberg, Germany.**

LEAD PENCILS, COLORED AND ARTISTS' PENCILS, AND CRAYONS.

Report.—Commended for the fine quality, beauty of finish, cheapness, and great variety of both lead and crayon pencils.

3. **Poure, Gillot, O'Kelly, & Co., Boulogne-sur-Mer, France.**

STEEL PENS AND PEN-HOLDERS.

Report.—Commended for good quality and reasonable prices.

4. **Leroy W. Fairchild & Co., New York, N. Y., U. S.**

GOLD PENS, GOLD PENCIL CASES, AND PEN-HOLDERS.

Report.—Commended for beauty of design, carefulness of finish, and excellence of workmanship; with special reference to the cases inlaid with pearl and precious stones.

5. **Aikin, Lambert, & Co., New York, N. Y., U. S.**

GOLD PENS, CASES, AND PEN-HOLDERS.

Report.—Commended for solidity of construction, novelty and beauty of design, especially for the arrangement of the movement in the pencil and pen cases, by which the pencil is carried forward and the pen retired by one action.

6. **Mabie, Todd, & Bard, New York, N. Y., U. S.**

GOLD PENS, CASES, PENCILS, AND HOLDERS.

Report.—Commended for general excellence, quality of workmanship, and elegant designs highly finished.

7. **John Foley, New York, N. Y., U. S.**

GOLD PENS, PENCIL CASES, AND PEN-HOLDERS.

Report.—Commended for firmness, careful manufacture, and durability, with solidity of material.

8. **John Holland, Cincinnati, Ohio, U. S.**

GOLD PENS.

Report.—Commended for superior elasticity and general excellence of gold pens, combined with economy.

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9. **Esterbrook Steel Pen Manufacturing Co., Camden, N. J., U. S.**

STEEL PENS.

Report.—Commended for excellent and uniform quality, great variety, and low price.

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10. **The Joseph Dixon Crucible Co., Jersey City, N. J., U. S.**

LEAD PENCILS.

Report.—Commended for the superior quality of pencils from American graphite; their smoothness, durability, and uniformity in various grades.

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11. **Eagle Pencil Co., New York, N. Y., U. S.**

LEAD AND OTHER PENCILS.

Report.—Commended for aquarelle pencils as a substitute for water-colors; for cheapness and good quality of lead pencils.

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12. **Bender & Phillips, Hohokus, N. J., U. S.**

SHEET WAX.

Report.—Commended for strength and pliability.

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13. **Daniel M. Somers, Brooklyn, N. Y., U. S.**

PEN-HOLDERS.

Report.—Commended for novelty in many of the designs, good workmanship, superior finish and reasonable price.

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14. **Eberhard Faber, New York, N. Y., U. S.**

STATIONERS' RUBBER GOODS.

Report.—Commended for the superior quality of the elastic bands, ink-erasers, rubber heads, and other vulcanized rubber goods for stationers' use.

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15. **Geo. F. Hawkes, New York, N. Y., U. S.**

GOLD PEN AND FOUNTAIN HOLDER.

Report.—Commended for ingenuity, and carefulness of construction of the patent fountain holders.

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16. **Janentzky & Co., Philadelphia, Pa., U. S.**

ARTISTS' MATERIALS.

Report.—Commended for general excellence of artists' supplies; brilliancy of colors, judicious selection and adaptation of materials, and carefulness in manufacture.

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17. **Nicholas Muller's Sons, New York, N. Y., U. S.**

BRONZE INKSTANDS.

Report.—Commended for novelty and beauty of design and elegant finish.

18. G. K. Cooke & Co., New York, N. Y., U. S.

REVOLVING HAND-STAMP.

Report.—Commended for rapidity of action, neatness of construction, and general adaptability, of rotary hand-stamps for bankers, railway companies, and commercial houses.

19. Brower Brothers, New York, N. Y., U. S.

INKSTANDS.

Report.—Commended for originality, utility, and general advantages, of the Euroid inkstand; especially adapted for use in the library, the hall, the desk, or the counting-house; stands very solid, not easily upset; economical; protects ink from atmospheric action.

20. Wm. A. Amberg, New York, N. Y., U. S.

CABINET LETTER-FILE AND SELF-INDEXING FILES AND BINDERS.

Report.—It is an excellent arrangement for classifying and binding letters and commercial papers, without folding, whereby they may be conveniently referred to without being indexed or numbered.

21. Geo. W. McGill, New York, N. Y., U. S.

PAPER FASTENERS.

Report.—Commended for their fitness and convenience for the purposes designed, and their adaptability to public wants, and for great variety for many purposes.

22. E. W. Woodruff, Washington, D. C., U. S.

FILE HOLDERS.

Report.—The file is so constructed that it is capable of holding a variable number of letters or papers. It is easy of access and convenient for reference. It is also capable of being changed into any size and placed in a cabinet or upon shelves.

23. H. Pensel & Co. (successor), Ludwigstadt, Bavaria, Germany.

SLATES FOR SCHOOLS AND COUNTING-ROOMS.

Report.—Commended for softness, smoothness, and general finish.

24. G. F. C. Beisbarth Son, Nuremberg, Bavaria, Germany.

PENCILS AND ARTISTS' BRUSHES.

Report.—Commended for superior quality and finish, carefulness of manufacture, and large and varied assortment.

25. Marcus Ward & Co., London, England.

STATIONERY FOR THE DESK, WRITING-PAPERS, AND ENVELOPES.

Report.—Commended for the general excellence of the articles exhibited.

26. Samuel Darling, Providence, R. I., U. S.

FOUNTAIN INKSTAND WITH PEN-GAUGE DIPPING-CUP.

Report.—This inkstand is made of glass, porcelain, bronze, or other material, in any desired form, and the ink is contained in an elastic vulcanized rubber fountain, the amount of ink in the dipping-cup being regulated by a thumb-screw. As there is never any air in the ink reservoir, the ink is not liable to thicken, but is at all times fresh. This inkstand has been used by the committee, and has given great satisfaction.

27. **The Hart, Bliven, & Mead Manufacturing Co., New York, N. Y., and Kensington, Conn., U. S.**

STATIONERY HARDWARE.

Report.—Commended for good quality, beauty of design, and fine finish. The ink-stands, pen-racks, and paper-files are cheap, being of imitation bronze.

28. **William Lyons, Manchester, England.**

SEALING WAX.

Report.—Commended for superior quality, purity, hardness in hot climate, and freedom from blister when exposed to the sun.

29. **Parkhurst & Gridley, Newark, N. J., U. S.**

GENERAL SHAWL AND BOOK STRAP.

Report.—An entirely new article, that wholly dispenses with the use of buckles and tuck straps, by the use of studs and protecting caps.

30. **Alexander Pirie & Sons, Aberdeen, Scotland.**

PAPERS.

Report.—The writing, enameled, rep, and other fancy papers of this celebrated house are very handsome in appearance, and are well sized.

The colors are exceptionally fine, and are not excelled by any in the Exhibition.

31. **Samuel Raynor & Co., New York, N. Y., U. S.**

ENVELOPES OF EVERY VARIETY OF QUALITY, FORM, AND SHAPE.

Report.—Commended for the greatest variety of envelopes in quality, form, and shape, more than twelve hundred different sorts being manufactured by the exhibitors; produced from paper manufactured from jute, rope, manilla, wood, rag, linen; also parchment, and cloth lined. All well made and well gummed.

32. **Joseph Parker, Son, & Co., New Haven, Conn., U. S.**

"COMMERCIAL" AND "TREASURY" BLOTTING-PAPER.

Report.—This exhibit contains blotting-paper of two qualities, "commercial" and "treasury," white and of various colors, and of various thicknesses from light to the heaviest manufactured. The "treasury" grade, in cleanliness or freedom from fibre-dust, in toughness, in pliability, and in absorbent quality, surpasses all other blotting-paper brought to our notice in the Exhibition. The colors are varied and excellent, the absorbent capacity extraordinary and conducive to economy in use.

33. **Byron Weston, Dalton, Mass., U. S.**

LEDGER AND RECORD PAPERS.

Report.—This exhibit of pearl and white, vellum and laid, ledger and record papers, is one of remarkable excellence. The colors are excellent, the assorting careful, the fibre long and tough, and the paper thoroughly sized. The finish is all that can be desired.

34. **Southworth Co., Mittineague, Mass., U. S.**

PAPER.

Report.—This exhibit contains ledger, letter, and various writing papers, all of the best quality in every respect, and remarkably free from imperfection of any kind; all of which show great skill and care in manufacturing.

35. Crane & Co., Dalton, Mass., U. S.

PAPER.

Report.—This exhibit contains bank-note, bond, and parchment papers. The bond papers are strong, flexible, and well sized. The bank-note paper, being the only exhibit made by a manufacturer and claimed to be for bank-note purposes, cannot be reported on as regards comparative merits. It is, however, entitled to a premium for its intrinsic merits, which are all that are required in a genuine bank-note paper.

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36. Crane Brothers, Westfield, Mass., U. S.

PAPER.

Report.—This exhibit contains ledger, flat cap, and letter papers, all of which are thoroughly sized and of sufficient strength. Their other qualities are excellent.

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37. Whiting Paper Co., Holyoke, Mass., U. S.

LEDGER AND FANCY AND COLORED WRITING PAPERS.

Report.—The ledger papers are of unusual length and strength of fibre, insuring toughness; they are strongly sized and of even finish and good color. The colored and fancy marked papers are of handsome colors, delicate tints, and tasteful designs and finish. The whole exhibit, in its fullness and variety, shows a thorough knowledge of the details appertaining to paper-making and the public wants of that character.

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38. Megargee Brothers, Philadelphia, Pa., U. S.

PLATE, ENVELOPE, WRITING, AND COLORED PAPERS.

Report.—This exhibit is notable and meritorious mainly for the variety and excellence of the colors and qualities of its medium and cheaper grades of paper. The granite papers especially are remarkable for their variety and beauty. The books and printed specimens submitted, showing the adaptability of the papers of this exhibit to the purposes for which they were intended, are entirely satisfactory.

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39. L. L. Brown Paper Co., South Adams, Mass., U. S.

PAPER.

Report.—This exhibit contains bond, ledger, and bank-folio papers, both wove and laid. The bond is good and well sized. The other papers are all remarkable for good qualities; the ledger papers possessing unusual strength and beauty, and a sizing that resists the severest tests of erasure and re-writing.

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40. Munich-Dauchau Machine Paper Co., Munich, Germany.

PAPER.

Report.—A very extensive exhibit of almost every needed variety of paper, at very low prices.

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41. J. H. Munktell, Grycksbo, Falun, Sweden.

PAPER.

Report.—This exhibit contains good writing paper, and excellent drawing and ledger papers which appear to be of the best quality.

42. M. Mayer, Coblentz, Germany.

ENVELOPES.

Report.—The envelopes in this exhibit are of good material and excellent workmanship, and are presented in a great variety of styles, adapted both to general and special purposes.

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43. Juan Romani & Purgdengolas, Capellades, Barcelona, Spain.

PAPER.

Report.—This is an exhibit of hand-made papers, containing light and heavy cap and letter and record paper. All of these are remarkable for good color, strength, and sizing, and are amongst the best papers of the kind brought to our notice in the Exhibition.

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44. Hurlbut Paper Co., South Lee, Mass., U. S.

FINE PAPER.

Report.—This exhibit contains writing and blank-book papers and cardboard, all excellent, of good color and finish, strong, and well sized. These qualities denote superior knowledge and skill in manufacture.

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45. Blanchet Brothers & Kleber, Paris, France.

PHOTOGRAPHIC AND WRITING PAPER.

Report.—This exhibit contains, as a specialty, photographic paper, which is of the best quality, and free, to all appearances, from metallic and other imperfections, the freedom from which is essential to good photographic paper. Many paper manufacturers have failed in their photographic paper on account of the difficulty of avoiding such imperfections, and the overcoming of this difficulty is evidence of science, skill, and care. There is shown, also, engine-sized writing paper of very superior quality.

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46. Eichmann & Co., Arnau-on-the-Elbe, Austria.

PAPER.

Report.—This exhibit comprises letter, note, drawing, fancy colored, card, cover, and a variety of other papers. The variety is very great, and all the papers are uniformly good.

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47. John Epstein, Soczewka, Warsaw, Russia.

PAPER.

Report.—Writing, plate, and blotting paper, each of excellent quality of its kind.

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48. Mirskowski Paper Mill Co., Wieruszew, Calisz, Russia.

PAPER.

Report.—A large variety of papers, including book, writing, and cigarette paper, all attesting the ability of the establishment to meet the public wants.

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49. Vargoonin Brothers, St. Petersburg, Russia.

PAPER.

Report.—This exhibit contains a large variety of papers, the chief of which are drawing, cap writing, letter, note, white and cream tinted book, plate, and cigarette. The papers are very good, of good colors, and well sized, and are remarkable for the excellence of the stock of which they are composed.

50. Capdevila & Co., Barcelona, Spain.

PAPER.

Report.—This exhibit contains letter, note, folio, ledger, cardboard, and cigarette papers. These are all of good color, strength, sizing, and finish; and the exhibit, as a whole, is exceptionally good.

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51. Cristobal Vila & Son, Capellades, Barcelona, Spain.

PAPER.

Report.—This is an exhibit of cigarette paper, and contains specimens variously flavored, as with balsam, liquorice, water-cresses, etc. The natural aroma and flavor of these are very perfectly preserved.

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52. Blanes Brothers, Alcoy, Alicante, Spain.

PAPER.

Report.—This exhibit contains cigarette paper, part apparently of pure linen stock, and part of linen and straw mixed. Both styles are excellent.

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53. José Mora Gavarro, Bocairente, Valencia, Spain.

PAPER.

Report.—There are three grades of cigarette paper, all exceptionally good.

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54. Rafael Comas Delgado, Onteniente, Valencia, Spain.

PAPER.

Report.—This exhibit contains a large variety of cigarette papers, all of which are light, strong, and apparently pure. The exhibit is exceptionally good.

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55. Widow and Son of Ferrer, Alcoy, Alicante, Spain.

PAPER.

Report.—There are three grades of cigarette paper, all excellent: They are light, strong, and apparently pure.

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56. Pedro Rius & Co., Barcelona, Spain.

PAPER.

Report.—This is an exhibit of cigarette paper, remarkable for strength. The other qualities are very good.

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57. Robert Fletcher & Son, Kersley Paper Works, Stoneclough, near Manchester, England.

WHITE AND COLORED AND TISSUE PAPER.

Report.—This exhibit of colored tissue and silvered papers is truly admirable and surpasses any other of its kind in the Exhibition. The paper is good, and the colors fine, varied, and remarkably well graduated. The tasteful arrangement of this display challenges the visitor's admiration.

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58. Charles J. Cohen, Philadelphia, Pa., U. S.

OILED PAPER, AND PORCUPINE QUILLS.

Report.—Commended for excellence of the quality, careful manufacture, and economy of oiled paper for copying-presses. Careful selection and preparation of the porcupine quills.

59. **Benfield, Brecker, & Co., City of Mexico, Mexico.**

PAPER.

Report.—An exceedingly tough and strong paper, retaining in a most remarkable degree the original strength of the fibrous material from which it is made.

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60. **Ostersetzer Brothers, Vienna, Austria.**

LACE PAPER.

Report.—Bouquet-holders of lace paper, tastefully arranged and well adapted for the purpose intended.

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61. **Imperial Maritime Customs, China.**

PITH PAPER.

Report.—This is the only exhibit found of pith paper for fine artistic work. It is perfectly clear and even in thickness, and is perfect of its kind

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62. **National Museum of Egypt, Cairo, Egypt.**

WRITING AND PRINTING PAPER.

Report.—The manufacture of machine-made paper is new in Egypt, and denotes material progress among the Egyptians. The National Museum exhibits paper of natural color made from banana leaves, and also a fair paper made from "halfa," a species of swamp rush. These are both new raw materials in actual paper manufacture, and reported to us as cheaper than rags as paper stock. The writing papers exhibited are of common quality, but are well manufactured. I think the National Museum entitled to an award for an excellent beginning in paper manufacture in Egypt.

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63. **Ivanhoe Manufacturing Co., Paterson, N. J., U. S.**

PAPER.

Report.—This exhibit contains thin super-calendered book paper, both white and toned; white and colored folios, known as French folios; and copying paper. The thin book papers are among the best on exhibition; the French folios remarkable for all the desirable qualities in such papers, viz., beauty, finish, strength, and good sizing; and the copying paper, of remarkably good color and finish, being the best white paper of its kind exhibited

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64. **Seymour Paper Co., Windsor Locks, Conn., U. S.**

PAPER.

Report.—This exhibit contains colored cover-paper of three different grades, each excel lent in its degree; blotting paper of good quality; granite and marble papers remarkably strong and well finished; and book and chromo papers well adapted to fine printing with type and cuts. The books and printed specimens presented afford good evidence of the excellence of the papers. An award is merited for the general excellence of the exhibit.

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65. **Tileston & Hollingsworth, Boston, Mass., U. S.**

PLATE AND CHROMO PAPER.

Report.—This exhibit contains steel-plate, chromo, and wood-cut papers, calendered and super-calendered. Even the thickest of these, which are the most difficult to manufacture, leave nothing to be desired. It is but just to say of the entire exhibit that it is exceptionally superior in every respect.

66. Jessup & Moore, Philadelphia, Pa., U. S.

PAPER.

Report.—This exhibit comprises copper-plate, lithograph, atlas, book, and news papers; also specimens of chemically prepared wood pulp. The latter is the best prepared, the most free from all that is not pure cellulose, and the most valuable article of its kind on exhibition. The super-calendered book papers, comprising several beautifully tinted and unlike any other exhibited, are much to be admired. The copper-plate, lithograph, and atlas papers are proved to be excellent by the books and specimens submitted for examination. The first quality of super-calendered white book paper is very meritorious.

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67. Joint Stock Co. of I. R. Chartered Paper Manufactory, Schlöglmühl, Vienna, Austria.

PAPER.

Report.—It is a roll of newspaper reeled for a perfecting press. The paper is remarkably well sized, is hard, of good quality, and is admirably well reeled for good press work.

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68. Fialkowski Brothers & Twerdy, Bielitz, Austria.

PAPER.

Report.—This exhibit is of ordinary printing and cover papers, and is remarkable for the great variety and excellence of its colors.

The prices attached are low for the grades of paper.

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69. Jas. Guie & Sons, Downingtown, Pa., U. S.

PAPER WRAPPERS.

Report.—This exhibit is of large and heavy wrappers for paper-makers' use. The wrappers are made of excellent stock, long, strong, and pliable, and are admirably adapted to the purpose for which they are intended.

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70. John Pfeffer & Co., Ghent, Belgium.

PAPER STOCK.

Report.—Commended for a system of grading and classification of rags for paper stock.

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71. Canada Paper Co., Montreal, Canada.

PAPER.

Report.—This is an exhibit of printing, envelope, blotting, and wrapping papers; all of good quality in their respective classes.

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72. Sundry Provinces of Japan.

PAPERS.

Report.—This exhibit is of great interest, as it presents a number and variety of papers not commonly known, many of which have remarkable intrinsic merit. Among these are—

1st. A paper imitation of grained morocco. This is a true imitation, being scarcely distinguishable from the genuine morocco. It is varnished in the most superior manner, equally well grained, flexible as morocco, and nearly as strong. The fibre is very strong and lengthy, and is described as being of the inner mulberry bark.

2d. Wall papers of various designs, some of which are faced with mica to afford lustre. This description of paper has been long used in Japan.

3d. Carpet paper, oiled and gilt to imitate leather flooring. These are remarkable for

strength, quality, design, and excellence of workmanship, and promise to be very serviceable. Transparent papers of great excellence, some of which are imitation of tortoise-shell.

4th. Writing papers to be written on with the usual Japanese brush, as this is universally employed instead of the pen.

5th. A variety of gilt and fancy papers, plain and embossed, all showing taste and care.

6th. Paper handkerchiefs and napkins, designed to be once used and discarded; they are soft and pleasant to feel, and seem adapted to answer well their purposes.

7th. Book paper for printing.

The whole exhibit is certainly very meritorious, and worthy of a complete description, such as would be too lengthy for this paper of recommendation.

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73. Owen Paper Co., Housatonic, Mass., U. S.

PAPER.

Report.—This exhibit comprises ledger, bond, exchange cap, policy, letter, and tinted papers, and is one of remarkable beauty and variety; its series of tinted writing papers being the richest in variety in the Exhibition. The parchment letter paper and exchange cap are very superior and well sized, and the papers generally need but a little stronger sizing to make them in all respects equal to any exhibited.

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74. A. Reed & Co., Philadelphia, Pa., U. S.

ORNAMENTAL BOOK-BINDING.

Report.—An exhibit of beautifully bound books, in a great variety of styles, all at reasonable prices.

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75. I. R. Beckett & R. Cervi, Cambridge, Mass., U. S.

BOOK-BINDING.

Report.—This is a unique and altogether praiseworthy exhibit, being the work of two journeymen, done out of working hours. The binding is all exquisite, and evinces not only a desire to improve on the part of the exhibitors, but an ability to originate and complete designs without outside aid. The exhibit furnishes an example worthy of imitation by workmen, of encouragement by employers, and of hearty recognition by the Centennial Commission.

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76. Oldach & Mergenthaler, Philadelphia, Pa., U. S.

BOOK-BINDING.

Report.—Commended for book-binding of general uniform excellence, at a moderate price.

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77. Gustav Fritzsche, Leipsic, Germany.

BOOK-BINDING.

Report.—In relation to the purposes intended, good quality combined with economy.

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78. Geo. W. Martin, Topeka, Kansas, U. S.

BOOK-BINDING, SPECIMEN OF RULING AND BINDING.

Report.—A seven-quire medium book, prepared for show. The cut is tastefully printed, and binding and ruling faultless.

79. American Baptist Publication Society, Philadelphia, Pa., U. S.

BOOK-BINDING.

Report.—A large display of books in elegant bindings of the richest material, crushed levant, pearl, inlaid, velvet, etc.

The juvenile books are specially commendable for their durable cloth binding, general excellence of printing, and moderate cost.

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80. D. Appleton & Co., Philadelphia, Pa., and New York, N. Y., U. S.

BOOK-BINDING.

Report.—Commended for the general excellence and elegance of the entire exhibit, which is the product of their own printing-office and bindery. The progress in the art of book-making is well illustrated in this exhibit by comparing the first book issued by the founder of this house in 1831 (a copy being shown) with the splendid exhibition now made of the educated taste and skill of the printer and binder, in the display of superbly printed illustrated books in crushed levant, vellum, and other fine bindings.

The school books in half vellum and the scientific books in superior style are a marked feature in this exhibit.

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81. American Tract Society, New York, N. Y., U. S.

BOOK-BINDING.

Report.—The specialty of this exhibit is the display of Bibles in flexible backs, which are the best brought to our notice in the Exhibition.

The leather used is of American manufacture, and is remarkable for its resistance to tensile force exerted to tear or crack it.

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82. William Mann, Philadelphia, Pa., U. S.

COPYING PAPER AND BLANK BOOKS.

Report.—The copying paper is of an exceedingly sensitive and impressible nature, capable of receiving and retaining fifteen distinct copies of one written original, and the blank books are of first-class excellence in every respect.

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83. W. W. Harding, Philadelphia, Pa., U. S.

BIBLES AND ALBUMS—PAPER-MAKING, PRINTING, AND BOOK-BINDING.

Report.—The Bibles shown in this exhibit are the product of the paper mill, printing-office, and book-bindery of the exhibitor, and the work in each department is first-class of its kind, and the prices reasonable. The photograph albums, with a so-called "chain back," are a notable feature of this exhibit.

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84. Ignatius Kohler, Philadelphia, Pa., U. S.

BOOK-BINDING.

Report.—Remarkable specimens of hand-tooled book-binders' work.

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85. J. B. Lippincott & Co., Philadelphia, Pa., U. S.

BOOK-BINDING AND PRINTING.

Report.—This exhibit is remarkable for its wide range in book-making, apparently covering the entire field, including blank books of great merit, school, law, medical, theological, and miscellaneous books, furnishing examples of almost every desirable style of printing and binding, and showing in both the typography and binding great fertility in designing and consummate art in the execution of printers' and binders' work.

86. **Wm. F. Murphy's Sons, Philadelphia, Pa., U. S.**

BLANK BOOKS.

Report.—It is evident that the most careful attention is paid to the minutest detail in the work shown in this exhibit, resulting in the highest degree of excellence, while the prices are moderate, thereby appreciating and meeting the demands of the public.

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87. **H. O. Houghton & Co., Riverside Press, Cambridge, Mass., U. S.**

BOOK-BINDING AND PRINTING.

Report.—Commended for an exceedingly rich and varied display of elegantly printed and bound books. In every style good taste predominates; and in the illuminated vellum books book-binding and decorating are elevated from a trade to a place among the fine arts.

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88. **Leusinger & Sons, Rio de Janeiro, Brazil.**

BLANK BOOKS, ALBUMS, PRINTED AND BOUND BOOKS, AND COMMERCIAL PRINTING.

Report.—A good variety of well printed and bound books, showing an educated familiarity with the details of book-making in all its branches.

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89. **J. Seckler, San Paulo, Brazil.**

BLANK BOOKS AND PRINTING.

Report.—Well-executed work and admirably suited to the public wants.

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90. **Francis & Loutrel, New York, N. Y., U. S.**

BLANK BOOKS.

Report.—Commended for well-made substantial blank books, with improved moulded backs.

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91. **Moss & Co., Philadelphia, Pa., U. S.**

BLANK BOOKS AND BOOK-BINDING.

Report.—Blank books, of both plain and more elaborate style of manufacture; all well done and at a moderate cost. Printed books in a variety of elegant bindings.

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92. **Sanford & Co., Cleveland, Ohio, U. S.**

BLANK BOOKS.

Report.—The books in this exhibit show the greatest skill and care in ruling, being the most perfect specimens of fancy ruling brought to our notice. The binding is elaborate and substantial.

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93. **Thomas Richards, Sydney, New South Wales, Australia.**

BLANK BOOKS—BOOK-BINDING AND PRINTING.

Report.—The entire work is of a creditable and praiseworthy character.

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94. **John D. Mets, Dubuque, Iowa, U. S.**

BLANK BOOKS, WITH PATENT ENDS AND SIDES.

Report.—Admirably made book, aside from the patent improvement as claimed.

95. **Scribner, Armstrong, & Co., New York, N. Y., U. S.**

BOOKS.

Report.—All the leading styles of the best classes of book-making are here represented; and the elegance of the typography of such books as "Bryant's History" and "The Myths of the Rhine" places this exhibit among the most praiseworthy in the Exhibition.

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96. **Porter & Coates, Philadelphia, Pa., U. S.**

BOOKS.

Report.—Commended for the originality of design in styles of binding; the great beauty of the printing of the illustrated books; and the general excellence of the mechanical execution of the entire collection, the binding being specially noteworthy as combining beauty with durability.

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97. **Miller's Bible and Publishing House, Philadelphia, Pa., U. S.**

BIBLES.

Report.—Commended as an exhibition of superbly bound Bibles, showing great taste and skill in the highest styles of the book-binder's art.

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98. **Allen, Lane, & Scott, and J. W. Lauderbach, Philadelphia, Pa., U. S.**

AN ILLUSTRATED BOOK, "A CENTURY AFTER."

Report.—The engraving and printing of this beautiful book were done in the offices of the firm, and are first-class in quality, bearing witness to the proficiency of the members of the firm in the branch of book-making which each represents.

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99. **J. M. Stoddart & Co., Philadelphia, Pa., U. S.**

BOOKS.

Report.—Commended because that, in the combination of steel-plate printing and letter-press, as shown in the "Gallery of Famous Poets" and the "Gallery of Famous Women," books of rare typographical beauty are produced, the printing, binding, and paper being apparently faultless. Great credit is also due to the publishers for furnishing, in such handsome styles and at moderate prices, such valuable books as "The Encyclopædia Britannica" and Hogarth's works.

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100. **François Vitè, Berlin, Germany.**

PHOTOGRAPH ALBUMS.

Report.—Commended for elegant and substantial work at very moderate prices.

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101. **J. C. König & Ebhardt, Hanover, Germany.**

ACCOUNT BOOKS.

Report.—Well-executed work at cheap prices.

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102. **Koch, Sons, & Co., New York, N. Y., U. S.**

GUARD BOOKS AND SCRAP BOOKS.

Report.—Commended for improved arrangement in the manufacture of guards for scrap and other guard books.

103. A. J. Holman & Co., Philadelphia, Pa., U. S.

BOOK-BINDING OF BIBLES AND ALBUMS.

Report.—This exhibit is especially noteworthy for the beauty and variety of Bibles and photograph albums displayed. The printing of the Bibles is admirably done, and the binding of both Bibles and albums is varied with good taste to meet the wants of customers; the prices of all being extremely reasonable.

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104. Lindsay & Blakiston, Philadelphia, Pa., U. S.

BOOKS.

Report.—Commended for an admirably well printed and bound collection of medical books, which, in style of manufacture and price, are adapted to the wants of the customers for whom they are designed.

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105. The American Bible Society, New York, N. Y., U. S.

BIBLES AND TESTAMENTS.

Report.—This exhibit displays thirteen sizes of Bibles in various bindings, the printing of all of which is remarkably good, and the prices low, adapting them to the general wants of the public.

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106. G. P. Putnam's Sons, New York, N. Y., U. S.

BOOKS.

Report.—Commended for the taste and skill displayed in books, handsomely printed and illustrated, and in fine style of binding.

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107. Harper Brothers, New York, N. Y., U. S.

BOOKS.

Report.—Commended for the extensive display of books adapted in style and price to the wants of the public; the exceptional typographical excellence of many of the illustrated books; the wood-cut printing of the picture papers, and the map printing of the school geographies.

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108. H. Dessain, Malines, Belgium.

BOOKS.

Report.—This exhibit is entirely of religious books, many of which display great merit in styles of type, and combination of type and colored inks.

The best features of antique books of this character are well produced, and the bindings are tasteful and good.

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109. Library Club, Paris, France.

BOOKS AND PAPER.

Report.—This is a collective exhibit made by the Library Club, and contains books, electrotyped and stereotyped plates, a complete set of printers' furniture, and samples of various styles of papers from several of the principal manufacturers of France, representing in all nearly fifty producers of books and of the different elements that enter into the completed book. The club displays a combination of excellent book and plate paper, choice types, rich illuminations, excellent bindings, and superfine security papers elaborately watermarked.

110. The Methodist Book Concern, New York, N. Y., and Cincinnati, Ohio, U. S.

BOOKS.

Report.—A large exhibit of very finely printed and bound books, consisting of Bibles, hymn books, and religious publications.

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111. Netherlands Booksellers' Association, Amsterdam, Netherlands.

BOOKS.

Report.—This is a collective exhibit of books contributed by various book publishers of the Netherlands. There is no departure from styles of paper, type, and binding in use thirty years ago in that country, but the exhibit as a whole is, in regard to those features, good.

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112. Government Exhibits of Egypt.

BOOKS IN MANY LANGUAGES.

Report.—Commended for the general excellence of the typography.

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113. Duchet & Co., Paris, France.

BOOKS.

Report.—This exhibit is principally of large volumes of illustrated art; paper excellent and durable; binding mainly in half calf, simple, strong, and proper; and type, of older style, clear and according to good taste.

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114. Dunod, Paris, France.

BOOKS.

Report.—The general character of the books is fair, and the paper not fine but good and strong, and the exhibit contains a few books excellent in all mechanical respects.

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115. A. Ballue, Paris, France.

BOOKS.

Report.—This is an exhibit of large illustrated works in all-leather binding; the plate paper is both good and strong, and the binding, though plain, is tasteful, strong, and suitable for its purpose.

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116. Ch. Delagrave, Paris, France.

BOOKS.

Report.—This exhibit is chiefly of educational books, paper generally not fine but strong and durable, and the type clear; binding plain, durable, and well suited for its purpose.

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117. Librairie Morel, Paris, France.

BOOKS.

Report.—This exhibit of books contains mostly illustrations of art and architecture, bound in half leather. The paper and type are excellent, and the binding simple, strong, and in good taste. One very large volume in particular, illustrations of Arabic life and art, size forty-nine by sixty-two centimetres, is exceptionally meritorious.

118. J. Baudry, Paris, France.

BOOKS.

Report.—This exhibit is chiefly of large volumes in half calf. The books are of excellent paper, well printed with clear and handsome type, and are tastefully and substantially bound.

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119. Alfred Rothe, Caracas, Venezuela.

BLANK BOOKS.

Report.—The blank books are made of excellent paper, are admirably well ruled, and bound in the most substantial manner.

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120. F. T. de Aldrey, Caracas, Venezuela.

PRINTED BOOKS.

Report.—Well selected type and paper, some of the binding quite rich and tasteful, and generally strong, serviceable, and in good style.

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121. G. & C. Merriam, Springfield, Mass., U. S.

BOOKS.

Report.—Commended for a unique collection of Noah Webster's works, showing the progress in the art of book-making in this country for a period of three-quarters of a century as illustrated by the works of one author. The marked advance is shown by comparing the Webster's dictionary published in 1816 with the elegant quarto edition, in superb binding and of exceptional typographical elegance, here exhibited.

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122. J. R. Osgood & Co., Boston, Mass., U. S.

BOOKS.

Report.—Exquisite taste in all the details of book-making marks the display in this exhibit, from the "large paper" editions to the tiny miniature volumes of the "vest pocket series," all being among the best of their kind. A notable feature is the display of the works of American authors, in the highest style of American book-making.

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123. Brewer & Tileston, Boston, Mass., U. S.

READING BOOKS.

Report.—The reading books (Hillard's Franklin series) are most beautifully printed; the wood-cuts artistic in design; and the books, in the perfection of their typography and wood-cut printing, are well calculated to educate the pupil in matters of taste and art.

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124. Mrs. H. G. Miller, Springfield, Mass., U. S.

SAMPLES OF JOB PRINTING.

Report.—A meritorious exhibit of job printing, consisting of cards, bill-heads, and circulars.

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125. A. Mourès, Alexandria, Egypt.

TYPE FOUNDING, AND PRINTING IN VARIOUS LANGUAGES.

Report.—Every item in the exhibit is of the highest degree of excellence in its class.

126. Lallement Brothers, Lisbon, Portugal.

SPECIMENS OF PRINTING.

Report.—Commended for a fine lot of printing in colors on satin; also for a quantity of circulars and bill-heads on paper. Typographical appearance and arrangement very fine.

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127. Louis Perrault & Co., Montreal, Quebec, Canada.

COMMERCIAL PRINTING.

Report.—Commended for great variety and good quality of the work exhibited and its adaptation to public wants.

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128. James Beal, Queensland, Australia.

BLANK BOOKS, PRINTING, AND BINDING.

Report.—The blank books are well made, and the printing and binding are in the highest degree creditable.

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129. C. G. Naumann, Leipsic, Germany.

COMMERCIAL PRINTING.

Report.—Commended for large variety, adaptability to the purposes intended, and cheapness in price.

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130. W. Drugulin, Leipsic, Germany.

BOOK PRINTING AND TYPE CASTING.

Report.—Commended for a rich assortment of type in two hundred and twenty-four different languages, and for well-printed books.

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131. Ludwig Lott, Vienna, Austria.

CHROMO-XYLOGRAPHIC PRINTING.

Report.—Valuable original miniatures of the fourteenth and fifteenth centuries, belonging to monasteries in Austria, are here reproduced by color printing from wood engravings in a most artistic manner. Among graphic artists there are but few who undertake work of this character; and since this exhibit shows remarkably true and elegant copies of fine originals, it is well entitled to award.

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132. Bradley & Ruloffsen, San Francisco, Cal., U. S.

PHOTOGRAPHS AND DESIGNS.

Report.—Photographs, clear in the design and of delicate modeling. Artistic attitudes are prominent merits.

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133. Sadic Bey, Cairo, Egypt.

PHOTOGRAPHY.

Report.—Commended for a photographic copy of the Koran, in size of 4 by 2½ centimetres, with gold margin, taken from a very valuable original belonging to the Khedive of Egypt. The skill and workmanship shown in the execution are very meritorious.

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134. Ousey Effendi, Cairo, Egypt.

SCHOOL BOOKS, AND BOOKS FOR THE BLIND.

Report.—Commended for the general excellence of the printing in each of the departments represented.

135. **Lortic, Paris, France.**

BOOKS.

Report.—This exhibit is principally a collection of rare or antique books of great value, all of which are exquisitely bound; commended for the richness and beauty of the bindings.

136. **Thos. Kelly, New York, N. Y., U. S.**

BOOKS.

Report.—Commended for an exhibit of Bibles and prayer books well and tastefully bound and printed in clear and beautiful type.

137. **Louis Dreka, Philadelphia, Pa., U. S.**

INVITATION CARDS AND STATIONERY.

Report.—Commended for tasteful designing and excellent workmanship on steel and copper plate, invitation and card engraving and printing; also for dictionary or word-book portfolio and blotter, which is convenient and well adapted for purpose designed.

138. **Government Printing-Office, Tokio, Japan.**

ENGRAVED COPPER PLATES.

Report.—This is an interesting exhibit of copper-plate engraving by native artisans. It is a new industry in Japan, and the samples exhibited, many of them for notes and bonds, are exceedingly creditable.

139. **Tiffany & Co., New York, N. Y., U. S.**

WEDDING STATIONERY.

Report.—Commended for tasteful and elegant designs of monograms and superior execution in workmanship.

140. **W. H. Hoskins, Philadelphia, Pa., U. S.**

ENGRAVED STATIONERY.

Report.—Commended for designing, engraving, and lithographing of commercial work.

141. **Narciso Ramirez, Barcelona, Spain.**

PLAYING CARDS.

Report.—A good, cheap, and well-made playing card.

142. **Patrocinio Maffei, Cadiz, Spain.**

PLAYING CARDS.

Report.—Commended for cheapness and durability.

143. **Fulladosa & Co., Barcelona, Spain.**

PLAYING CARDS.

Report.—Commended for superiority in their fast colors.

144. **Charles Goodall & Son, London, England.**

PLAYING AND CHRISTMAS CARDS.

Report.—Commended for a large variety of styles of decoration on the backs of his cards; all executed in good taste and design.

145. **W. O. Davey & Sons, Jersey City, N. J., U. S.**

BINDERS', TRUNK, AND BOX BOARDS.

Report.—These boards are first-class, being hard, smooth, and tough.

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146. **H. G. D. Cramer, Ootmarsum, Netherlands.**

PASTEBOARD.

Report.—The boards are very strong and tough. One sample is three-quarters of an inch thick, and very hard. They are all cheap and well made.

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147. **Saint Croix River Mills, Saint Croix, Nova Scotia.**

BINDERS' PASTEBOARD.

Report.—Commended for the good quality of binders' board, at a low price.

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148. **Coromina & Antiga, San Juan las Fonts, Gerona, Spain.**

STRAW BOARDS.

Report.—Commended for a strong and well-made straw board, for book-binders' and box-makers' use.

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149. **Segundo de Olea, Cadiz, Spain.**

PLAYING CARDS.

Report.—Commended for great variety of styles and designs, and beauty of printing.

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150. **A. Dougherty, New York, N. Y., U. S.**

PLAYING CARDS.

Report.—Commended for strength and superior quality of stock from which they are made, producing a card not liable to split or thicken; also for perfection in the workmanship, especially in cutting the cards to a uniform and exact size, not obtained by any other exhibit.

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151. **Cornell & Shelton, Birmingham, Conn., U. S.**

FOLDING PAPER BOXES.

Report.—Strong self-fastening, folding boxes, suitable for packing tacks, screws, rivets, brass chains, etc.

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152. **Rhode Island Cardboard Co., Pawtucket, R. I., U. S.**

CARDBOARD.

Report.—These boards are of excellent quality, possessing stiffness, elasticity, and finish.

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153. **Dennison & Co., Boston, Mass., U. S.**

JEWELERS' FINDINGS, TAGS, AND SURGICAL COTTON.

Report.—Commended for a fine display of a full and excellent line of jewelers' findings, such as colored cotton, cards for jewelry, tags, sealing wax, twine, watch-bags, labels, tissue paper, and boxes. Also for patent shipping tags of superior quality and strength, being so constructed, with a patented eyelet, that they may be used with security.

154. **Howlett, Onderdonk, & Co., Philadelphia, Pa., U. S.**

MACHINE-MADE PAPER BAGS.

Report.—Commended for convenient shape, uniformity of manufacture, good workmanship, and economy in cost.

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155. **Jean Baptiste Poissonniez, Brussels, Belgium.**

CASES FOR JEWELERS, CONFECTIONERS, AND CARDS OF SAMPLES.

Report.—Commended for a fine line of jewelry and druggists' boxes, glove boxes, India shawl boxes and confectioners' boxes. They are very tasteful in design and well made. These goods are very cheap.

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156. **N. M. Kerr & Co., Philadelphia, Pa., U. S.**

WEDDING AND JEWELERS' PAPER BOXES.

Report.—Wedding and jewelers' boxes are the specialties. The boxes indicate perfection in cutting and fitting of lids, also in fine workmanship. In combination of colors and style of printing they display good taste.

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157. **Bennet Osborn, Newark, N. J., U. S.**

PAPER BOXES.

Report.—Commended for originality, utility, fitness for the purposes intended, and adaptation to public want.

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158. **Porter & Bainbridge, New York, N. Y., U. S.**

VISITING AND WEDDING CARDS AND PAPETERIES.

Report.—It is a very large and excellent exhibit of blank, visiting, and wedding cards, among which are the following varieties: gilt and silver edged, round cornered, black cards, crystal cards, wooden and silver cards for wedding stationery, *ladies' postal cards*, or cards d'élite, rep cards, and a variety of plaid cards. They are all well made and of good stock. There is also a close imitation of hand-made paper for papeterie stationery. It is a complete exhibit.

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159. **McNeil, Irving, & Rich, Elwood, N. J., U. S.**

BUILDING AND CARPET PAPER.

Report.—This exhibit is mainly of water-proof building paper. It is thoroughly sized to resist the action of water, and appears to be the strongest and most durable of the natural or untarred building papers exhibited. It is certainly well adapted to a great variety of useful purposes.

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160. **George P. Tangemann & Co., Hamilton, Ohio, U. S.**

ROOFING AND CARPET PAPER.

Report.—Commended for superior strength in roofing paper; also smoothness, elasticity, and durability in carpet paper.

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161. **Barrett, Arnold, & Kimball, Chicago, Ill., U. S.**

ORNAMENTAL ALUMINOUS BUILDING PAPER.

Report.—It is designed to supersede in a great measure lathing and plastering of interior walls, and it enables cheaply built houses to take on a cheap and sightly finish. On account of its substantial thickness it promises to be very durable. It is useful and cheap, and meets a need felt in the community.

162. Munksjö Paper Mills, Jönköping, Sweden.

BUILDING PAPER.

Report.—It is of excellent quality, handsomely prepared, and is one of the best exhibits of the kind shown.

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163. Crane Brothers, Westfield, Mass., U. S.

PAPER BASKETS.

Report.—This is an exhibit of paper baskets made from manilla paper. They are light and water-proof, and well adapted for use in cotton, wool, silk, carpet, and paper mills.

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164. E. Waters & Sons, Troy, N. Y., U. S.

PAPER CANS FOR KEROSENE OIL.

Report.—This exhibit shows praiseworthy progress in the manufacture of paper utensils for special and general purposes.

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165. French Paper Ware Co., Springfield, N. J., U. S.

PAPER WARE.

Report.—This exhibit contains water-pails, wash-bowls, slop-jars, flower-pots, and spittoons made from manilla paper pulp. They are strong, light, tough, and of good finish.

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166. Anthony Goth, Bethlehem, Pa., U. S.

OIL-PAINTED WALL PAPER.

Report.—This exhibit contains oil-painted wall and cornice papers, to be used as substitute for hand painting. The oil not striking through, the paper is not made brittle by its use. The designs are tasteful, the solid colors good, and the paper can be washed.

The exhibit has merit.

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167. C. A. Kaberg, Stockholm, Sweden.

WALL PAPER.

Report.—This exhibit comprises a great variety of designs, and of qualities of paper; the lowest in price being remarkably cheap, and the highest very rich in design and manufacture.

The velvet papers merit special attention.

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168. F. H. Frolich & Son, Christiania, Norway.

PAPER HANGINGS AND BORDERS.

Report.—This exhibit comprises an unusually large number of designs, the details of which are well executed. Commended for the variety of designs, the richness of many of the papers, and the reasonable prices.

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169. Ernesto Lefebvre, Count of Balsorano, Naples, Italy.

WALL PAPER.

Report.—This is one of the most interesting exhibits of decorative paper made, and is remarkable both for its elegant styles and low prices. Among the articles shown are specimens of very rich velvet paper, of good imitations of the ancient frescoes of Pompeii, and of sundry artistic designs of pure and classic taste. The entire exhibit has great merit.

170. Howell & Brothers, Philadelphia, Pa., U. S.

DECORATIVE PAPER.

Report.—The exhibit made is remarkable for the variety and excellence of its standard, medium and lower grades of papers, and for the low wholesale prices furnished by the exhibitors.

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171. Howell & Bourke, Philadelphia, Pa., U. S.

DECORATIVE PAPER.

Report.—The fresco decorative papers of this exhibit are exceptionally good.

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172. Westerburg, Jefferson, & Co., New York, N. Y., U. S.

DECORATIVE PAPER.

Report.—This exhibit is specially notable for the variety and richness of its fresco and gilt papers.

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173. Frederick Beck & Co., New York, N. Y., U. S.

PAPER.

Report.—The exhibit is remarkable for the variety and excellence of its higher grades of papers, which are amongst the highest and most tasteful produced. Its mica-coated papers are a specialty, and deserve high commendation. The prices furnished are very reasonable.

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174. C. Herting, Einbeck, Hanover, Germany.

DECORATIVE PAPER.

Report.—Commended for excellent design and finish, and imitation of lustre of mother of pearl. The diamond-powder finish is an invention of the exhibitor, and has been brought to great perfection in this exhibit.

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175. Jeffrey & Co., London, England.

DECORATIVE PAPER.

Report.—They exhibit several specimens of work of art in paper decoration, which display the highest and purest taste. Such productions deserve special recognition, and tend to elevate paper as a decorative article.

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176. Louis Dejonge & Co., New York, N. Y., U. S.

FANCY PAPERS AND BOOK-BINDERS' CLOTHS.

Report.—This exhibit contains many specimens of very superior colored, fancy, silvered, glazed, enameled, and embossed papers, and is among the largest, richest, and best shown. The book-binders' cloths are also numerous and excellent.

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177. Alois Dessauer, Aschaffenburg, Germany.

FANCY PAPERS.

Report.—This exhibit of marbled and other fancy papers is of the first order, and contains a remarkably rich variety. The imitations of fine marbles are truly admirable, and the whole exhibit is entitled to the highest praise.

178. W. Knepper's Nephew, Vienna, Austria.

FANCY PAPER.

Report.—This exhibit of marbled and other fancy papers is of the first order, rich in variety and admirable in execution.

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179. R. T. Hazzard, Philadelphia, Pa., U. S.

WALL PAPER DECORATIONS.

Report.—This exhibit illustrates a system of wall and ceiling decoration, imitating cheaply, in paper, stencil and fresco painting.

The designs are so arranged and printed that they can be combined, divided, subdivided, and recombined in a great variety of complex ornaments, and in this manner a few printing blocks can be made to produce as many effects as are ordinarily produced by a great number. There is decided economy in the system, and the colors and designs are very good.

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180. Leo Haenle, Munich, Germany.

GOLD AND SILVER PAPER.

Report.—This exhibit contains plain and embossed, genuine and imitation gold and silver, and also tinted papers. These are used principally for covering fine boxes and mounting fine pictures, and are of the highest quality. One feature of great merit in this exhibit consists in the extraordinary length of faultless sheets.

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181. F. Daye & Co., Schaerbeek, near Brussels, Belgium.

IMITATION OF EMBOSSED LEATHER.

Report.—This exhibit shows in paper board, embossed and colored, beautiful and accurate imitations of the celebrated old leather hangings of Malines and Cordova. It revives a taste long lost, and is a valuable contribution to art.

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182. Eduard Sieger, Vienna, Austria.

IMITATIONS OF INLAYING ON PAPER.

Report.—The inlaying of ebony with ivory, and inlaying of ivory with ebony, are most tastefully and artistically imitated. Also the taste and execution in job printing, plain and fancy, of this exhibit are very superior.

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183. R. Kerkhoven, Utrecht, Netherlands.

WOOD AND MARBLE PAINTING.

Report.—It has decidedly superior merit.

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184. M. Van der Burgh, Schiedam, Netherlands.

IMITATIONS OF MARBLE AND WOOD.

Report.—They are most excellent imitations, of unusual merit.

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185. C. T. F. Rijperman, Velzen, Netherlands.

WOOD PAINTING.

Report.—It has decidedly superior merit.

186. **I. P. Dobbe, The Hague, Netherlands.**

WOOD AND MARBLE PAINTING.

Report.—It has decidedly superior merit.

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187. **A. R. & P. Van der Burgh Brothers, Rotterdam, Netherlands.**

IMITATIONS OF MARBLE AND WOOD.

Report.—The imitations of various woods, of inlaying of woods, and of many varieties of marble, are of extraordinary merit; and the artistic taste displayed is fully equal to the execution.

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188. **John Dickson & Co., Philadelphia, Pa., U. S.**

VULCANIZED RUBBER ENGRAVINGS.

Report.—Commended for originality, durability, and cheapness. The designs, which are drawn upon ordinary lithographic stones previously covered with asphaltum varnish, do not require a specially educated artist, but can be made by any one skilled in drawing. The completed sketch, after being etched with nitric acid, is covered with prepared rubber of the proper thickness, which is subjected to pressure and vulcanized, an operation requiring but a few hours, when the plate is ready to be blocked and used in the same manner as an ordinary electrotype. The process is specially adapted for the production of work with fine lines.

A plate from which one hundred thousand impressions had been taken was shown, and it seemed in good condition for many thousands more.

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189. **F. Tuchfarber & Co., Cincinnati, Ohio, U. S.**

ENAMELED IRON SHOW CARDS.

Report.—The execution displays artistic excellence, and the colors are brilliant and transparent. These articles, so admirably meeting public demand, are in every respect the best of their kind in the Exhibition.

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190. **A. Dunlop Gordon, Philadelphia, Pa., U. S.**

BUILDING AND MANILLA CONCRETE FELTS.

Report.—This exhibit is principally of manilla paper, prepared or tarred, for various building purposes, and lining of floors, walls, tanks, etc.; is equal in strength to any, and smoother than any, prepared paper exhibited; and it is suitable for more purposes than common building paper.

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191. **Benj. O. Woods & Co., Boston, Mass., U. S.**

AMATEUR PRINTING PRESSES.

Report.—Commended for compactness, strength, ease with which the form can be adjusted and its position changed, and the general adaptation of the press for amateur work.

The "Novelty" press is made in several sizes, works well, is easily understood, and is not liable to get out of order.

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192. **Greenwood & Batley, Albion Works, Leeds, England.**

JOB PRINTING PRESS.

Report.—Commended for general excellence as a machine for doing fine work.

The "Sun" machine is strongly built; the platen moves squarely up to the bed; there is great strength of impression, and a very large ink distribution; a combination of great utility.

193. William Shaw, London, England.

CARD PRESS.

Report.—Commended for compactness, simplicity, and great speed.

This press has an automatic feed, adjustable to any thickness of card, and prints seven thousand per hour.

All its arrangements appear to be well planned and efficient.

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194. Degener & Weiler, New York, N. Y., U. S.

JOB PRINTING PRESSES.

Report.—Commended as very simple in construction and strong. The form of type is very accessible for corrections or alterations, and the platen easily reached when making ready.

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195. Golding & Co., Boston, Mass., U. S.

SMALL JOB PRESSES.

Report.—Commended for simplicity, compactness, rapidity of operation, and ease of running. The series of "Pearl" presses are well made, easily adjusted to work a single line or a full form; are self-inkers, with a good distribution; work nicely, and are well adapted for general use.

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196. Boston & Fairhaven Iron Works, Fairhaven, Mass., U. S.

NEWSPAPER AND JOB PRINTING PRESS.

Report.—Commended for strength and durability, simplicity of construction, ease of adjusting rollers and ink-fountain, adaptability for newspaper and job work, and general excellence. The "Improved Fairhaven" press does excellent work, has a speed of one thousand per hour. The bed is moved by a lever and connecting rod, which holds it firmly in position.

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197. C. C. Child, Boston, Mass., U. S.

COUNTRY NEWSPAPER AND JOB PRESS.

Report.—Commended for compactness, ease of running, facility for changing and making forms ready, excellence of ink distribution, and general adaptation to the wants of a country newspaper and job office.

The "Acmé" country newspaper and job press runs exceedingly light and easy; is simple in construction; has an excellent ink distribution; does good work; and has a speed of eight hundred impressions per hour by hand and twelve hundred by steam power.

It has many small arrangements of convenience and utility.

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198. Gustav L. Jaeger, New York, N. Y., U. S.

MACHINE FOR PASTING AND COMBINING PAPER OR TEXTILE FABRICS IN SHEETS.

Report.—A very compact machine for making two sheet pasteboards, or combining paper with textile fabric for paper-collar work, or cloth-lined paper for envelopes, etc. The design and arrangement very practical, and indicating great care in construction. Although the exhibitor was unable to secure the space necessary for showing the drying cylinders in operation, I have no hesitation in recommending the whole machine for award.

199. **A. & B. Newbury, Coxsackie, N. Y., U. S.**

JOB PRINTING PRESSES.

Report.—A very strong press, working by hand with very little power: the bed, remaining stationary and holding the form in a vertical position, is easily reached by the operator.

The machine is provided with an excellent movement for throwing off the impression in order to work up the colors.

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200. **Merritt Gally, New York, N. Y., U. S.**

UNIVERSAL JOB PRINTING PRESSES ONE-HALF SHEET AND ONE-EIGHTH SHEET MEDIUM.

Report.—These presses combine the advantages of both the cylinder and platen motion. The direct action of the platen, with a full rest for laying on the paper, coupled with the perfect control of the operator over the inking, enables these presses to turn out very good work. They are so strongly made that they can be used for embossing cameo dies in color.

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201. **George P. Gordon, New York, N. Y., U. S.**

JOB PRINTING PRESSES.

Report.—Commended as simple in construction, with good rest on impression, and full time for laying on the paper. Excellent distribution insured by division of inking table in two circles revolving in opposite directions.

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202. **Bullock Printing Press Co., Philadelphia, Pa., U. S.**

ROTARY PERFECTING WEB PRINTING PRESS.

Report.—The press is low and compact, so as to be well under the eye and control of the operator. It is easy of access for the adjustment of forms and rollers. It has no delivery tapes to choke up in case of accident. The web is near the floor, is easily put in place, and unequal tension is taken up on it before reaching the press, by a simple balanced equalizing bar.

The Bullock was the first successful web printing press made in America.

The press on exhibition uses two sets of stereotype plates on long cylinders, and prints from a web twice as wide as the printed sheet.

At a competitive trial (Machinery Hall, June 28, 1876) it printed fourteen thousand eight hundred and fifty-six copies of the New York Herald, or seven thousand four hundred and twenty-eight impressions, in one hour, including eight and three-quarter minutes lost time by reason of stoppages from accident and to renew the web. Quality of work good; number of sheets spoiled, forty-six. Force to operate press, two men, with two boys to take away sheets. The press was examined after running and was found in good order. These machines are built to print either a four, eight, or sixteen page paper. The web of paper was sixty-three inches wide, size of the printed papers forty-five and three-eighth inches by thirty-one and one-half inches ($45\frac{3}{8} \times 31\frac{1}{2}$).

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203. **Cottrell & Babcock, New York, N. Y., U. S.**

STOP-CYLINDER PRINTING PRESS.

Report.—An exceedingly well made machine, finished with great care, and well designed for securing the accurate working of all the bearings. Very full and perfect distribution with the strongest ink. Well adapted for printing the finest illustrated works.

204. C. Potter, Jr. & Co., New York, N. Y., U. S.

STOP-CYLINDER PRINTING PRESS.

Report.—Designed and constructed with great care and with special regard to strength where most needed; very perfect rolling and distribution, with a firm, strong, steady impression.

This machine has a new movement called the "trip-at-will," giving the operator absolute control over the machine and preventing the spoiling of paper.

The movement for automatically rolling the form three or four times for each impression is an advantage.

The machine has many minor improvements, calculated to insure the production of illustrated works in the best style.

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205. R. Hoe & Co., New York, N. Y., U. S.

FAST PRESSES FOR PRINTING NEWSPAPERS FROM THE WEB.

Report.—Two of these presses are exhibited by the manufacturers. They may both be described as perfecting presses for printing newspapers from the web, one having an accumulating cylinder and fly delivery, the other working with a folder in place of the accumulator. With the exception of the difference in delivery, the machines are identical.

They are so constructed as to give to the operator thorough control and freedom of access to all the working parts, when putting on the plates, adjusting the rollers, replacing the web in case of a stoppage from faulty manufacture of the paper, accidental tear, or other similar causes. The position of the web of paper immediately over the printing cylinder gives great facility of feed, and enables the machine to print a thinner and lower quality of paper, as it provides for a minimum strain on the web.

A competitive trial of this machine was held in Machinery Hall on June 29, with the following result:

The machine worked with a double set of plates, and produced ten thousand nine hundred impressions, or twenty-one thousand eight hundred copies. The time lost amounted to fourteen minutes fifteen seconds, viz., seven minutes thirty seconds from stoppages caused by defects in the rolls of paper, five minutes forty-five seconds occupied in putting on two fresh rolls of paper, and one minute removing a form roller that had melted. The machine was frequently timed, and worked when running at an average speed of fourteen thousand four hundred impressions, or twenty-eight thousand eight hundred copies, per hour. A lower rate of speed would probably have reduced the lost time and the number of waste copies. The papers were well printed, although the machine worked for some time with only one form roller. At the conclusion of the trial the bearings of the press were cool and in good order. The folding apparatus worked admirably during the whole trial, never making a faulty fold or tripping, and delivered the newspapers in excellent condition. It is a most valuable addition to the machine.

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206. Globe Manufacturing Co., Palmyra, N. Y., U. S.

PRINTING PRESSES.

Report.—A variety of small printing presses, known as the "Peerless Presses." These presses work very lightly by hand, are well constructed, and, having a stop motion by which the form can be rolled twice or three times on each impression, circulars with fine wood-cuts can be printed by them.

207. John Walter, London, England.

PRINTING PRESS.

Report.—This press is what is known as a web perfecting press, taking the paper from a web or roll and delivering the printed sheets. The idea of a web perfecting press is not a novel one, presses upon this principle having been projected nearly half a century since. The development of the principle is what claims attention.

It is simply and strongly constructed, with little liability to get out of order, and so arranged that the forms can be easily and quickly got ready after the last plate has been received from the stereotyper.

On the 28th of June the press was run one hour, with the following result. Prior to the commencement of the trial, the press had all the plates on but the last one and the rollers in. In three-fourths of a minute the last plate was securely put in place, and in one minute additional the first perfect sheet was delivered. The press was stopped twice to put on new rolls of paper, requiring in one case two minutes and in the other two minutes and five seconds, and, in consequence of clogging of the sheets, the press was stopped two and one-quarter minutes: total stoppage six minutes twenty-two seconds. The press printed the New York Times, and the register showed a total of ten thousand four hundred and fifty-five impressions.

The running was timed repeatedly, and found to be two hundred per minute, and for the first fifteen minutes, during which there was no stoppage, the register showed exactly three thousand impressions.

The size of the form was thirty-four and one-quarter by forty-four inches, and the web of the paper was thirty-six inches in width. Twenty copies were spoiled, and all at the time the paper jammed at the head of the delivery frame.

The papers were well printed, and the press worked very satisfactorily. At the conclusion of the trial the journals of the press were examined, and were not in the least heated. The rollers (evidently not recently made) were in good condition, and not at all softened.

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208. R. Hoe & Co., New York, N. Y., U. S.

PRINTERS' PRESSES AND MATERIALS.

Report.—In addition to the Newspaper Web Perfecting Presses referred to in another report, the exhibitors have sent in for competition ten large printing presses, two lithographic printing presses, proof presses, imposing tables, composing frames, and a great variety of other articles required for the use of printers. The presses, whether for newspapers printed from sheets, for first-class illustrated work, for general book work, or for jobbing and commercial printers' use, are all well designed, strong, and finished in a superior style. The general materials for use in printing-offices are of the most modern patterns, well finished by skillful workmen.

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209. Campbell Printing Press and Manufacturing Co., New York, N. Y., U. S.

PRINTING PRESSES.

Report.—The art, book, news, and country presses are well made and adapted to the work for which they are intended, and capable of doing good work.

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210. Ferd. Lotz, Offenbach-on-the-Main, Germany.

LITHOGRAPHIC ENGRAVING MACHINE.

Report.—An excellent machine, well and carefully constructed, suitable for use on stone, steel, or copper; has numerous adjustments for different classes of work, and can engrave either a simple straight line pattern or a complicated piece of geometric work. It has also a clever adjustment for relief work, which can be made to produce the design either smaller or larger than the original die.

211. A. Vital, Paris, France.

LITHOGRAPHIC MACHINE ROLLERS MADE OF LEATHER.

Report.—Made with very great care and accuracy; the seams joined with great skill.

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212. P. Alauzet, Paris, France.

LITHOGRAPHIC PRINTING MACHINE.

Report.—Well designed and constructed for the execution of first-class work, and especially useful for color work requiring the most accurate registering.

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213. Ch. Derriey, Paris, France.

MACHINE FOR NUMBERING CONSECUTIVELY BONDS WITH COUPONS.

Report.—This machine combines, in one frame, forty-two type numbering machines, with figures suitable for numbering consecutively, at one operation, the body and the counterpart of an ordinary bond and each of the coupons attached to it. The spaces can be arranged to number either a larger or a smaller number of coupons, as may be required. The frame is placed on a printing press adapted to the machine, and the great merit of the invention is found in the simple arrangement by which all the figures of the numbering cylinders change consecutively at each revolution of the press.

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214. J. & E. Waldron, New Brunswick, N. J., U. S.

WALL PAPER PRINTING MACHINE AND TURN-AROUND DRYING MACHINE.

Report.—A good practical machine, thoroughly well designed and effectively carried out in all its details. The arrangement for supplying the color by a continuous web of sieve cloth answers well; the machines generally will no doubt do public service by tending to reduce the price of ordinary paper hangings.

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215. W. O. Hickok, Harrisburg, Pa., U. S.

PAPER RULING MACHINES.

Report.—This paper ruling machine is cheap, simple, and easy of operation. It requires no high degree of skill to operate it. The paper ruled by it is uniform and free from offset. The work may be done at high speed. The machine has improvements in the striker, which enable it to register column rules from different head-lines with exactness. It is well known as a standard machine in American binderies and blank-book factories.

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216. Chas. Eneu Johnson, Philadelphia, Pa., U. S.

AUTOMATIC FEEDER FOR PRINTING MACHINES.

Report.—This feeder may be attached to any printing machine, and will feed a sheet of double super royal at the rate of one thousand per hour, and smaller sizes at greater speed.

The perforating point or cutter, by which only one sheet of paper can be picked up at once, is an ingenious contrivance.

The apparatus is inexpensive.

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217. Rose & MacDonnell, Philadelphia, Pa., U. S.

PRINTERS' ROLLERS.

Report.—The composition is carefully prepared and well adapted for the purpose intended; cast in blocks for easy transmission to country printers; rollers in exhibit thoroughly well cast.

218. E. H. Barney, Springfield, Mass., U. S.

BANK PERFORATING STAMP.

Report.—Commended as a simple, well-made, and ingenious machine for perforating checks, bonds, certificates of stock, etc., to prevent alteration. It is easily and quickly adjusted for any required amount, and is not liable to get out of order.

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219. Fry's Engraving Establishment, Philadelphia, Pa., U. S.

ENGRAVED DIES, STAMPS, AND TOOLS.

Report.—This is an exhibit of engraved dies for the ornamentation of books, and of stamps and tools used by book-binders. The brass dies exhibited show superiority of workmanship and design.

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220. M. S. Nordström, Stockholm, Sweden.

CORK-MARKING STAMPS.

Report.—Commended for novelty and cheapness.

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221. Maclachlan, Hopkins, & Co., New York, N. Y., U. S.

PAGING AND NUMBERING MACHINES.

Report.—Commended for simplicity, ease of running, facility for adjusting different sizes of figures, and general adaptation for the work for which they are designed. The double-head machine is arranged to number both a check and its counterpart at one blow, or it will at the same time number two coupons. The cylinders on the paging machine are with great facility changed to print large or small figures; and both machines are conveniently arranged for disposing of sheets of paper after they are numbered.

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222. W. A. Kelsey & Co., Meriden, Conn., U. S.

AMATEUR PRINTING PRESSES.

Report.—Commended for simplicity and effectiveness and novelty in the chase. The "Excelsior" is an amateur press, is strongly made, and works well. The patent chase has a bottom which enables the amateur to easily arrange his form to work evenly, and avoids much of the risk of accidentally disarranging the type.

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223. Bauer's Type Foundry, Frankfort-on-the-Main, Germany.

TYPE FOUNDING AND CUTTING.

Report.—Commended for original and tasteful designs and excellent workmanship.

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224. Charles S. Westcott, New York, N. Y., U. S.

MACHINE FOR CASTING, DRESSING, AND COMPOSING TYPES IN ONE COMBINED OPERATION.

Report.—A very bold and clever invention, especially when we remember how many mechanical devices have been tried, at considerable expense, for years past, in attempting to construct composing machines.

This machine deserves special praise for the ingenious and skillful manner in which the matrix for the particular type required is brought into position for casting. The types are well finished, considering all the difficulties to be overcome, and reach their place in the galley-stick smoothly and easily.

225. National Printing-Office, Lisbon, Portugal.

SPECIMENS OF TYPE AND TYPOGRAPHY.

Report.—The specimen-book of types, borders, etc., is very fine. The typographical appearance of the books of this exhibit is exceedingly creditable.

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226. Heinrich Flinsch, Frankfort-on-the-Main, Germany.

TYPE.

Report.—Commended for the large assortment of original punches of every description, eighty-eight thousand and ninety-seven original punches and one hundred and fifty-two thousand seven hundred and thirty-seven matrices belonging to the establishment.

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227. George Bruce's Son & Co., New York, N. Y., U. S.

PRINTING TYPES.

Report.—Commended as book and newspaper type of great hardness; for beauty of design, especially in kerned and ornamental type for imitating engraving. Besides the type shown, a specimen-book embracing a large variety of plain and ornamental types bore testimony to the good taste of the firm in their general manufacture.

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228. The Wm. H. Page Wood Type Co., Greeneville, Conn., U. S.

WOOD TYPE.

Report.—Commended for superior workmanship and artistic designs. The wood type and borders are beautifully cut in hard and durable wood, and the specimen-book shows great variety in design.

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229. M. Alissof, St. Petersburg, Russia.

TYPE-WRITER; NEW METHOD FOR PRINTING MUSIC BY PHOTO-LITHOGRAPHY.

Report.—This machine is called a "type-writer," but should perhaps be more properly termed a type-printer, the impressions of the letters being equal to ordinary book-printing, the types being worked by rollers, as in ordinary printing presses.

The machine produces excellent work, and may be advantageously used for making clear, regular, and well-finished copies of bad manuscripts, letters, or other documents, with transfer ink, and transferring to a lithographic stone or a zinc plate. The machine contains two hundred and forty characters, or nearly five times as many as the type-writer now in use. It has been beautifully and carefully constructed, and deserves great commendation. The new method of preparing cliches or stereos for printing music by photo-lithography is a most ingenious invention, and doubtless calculated to lead to a much more economical production of songs, copies of music for singing-classes, choirs, and bands.

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230. Mackellar, Smiths, & Jordan, Philadelphia, Pa., U. S.

TYPE-FOUNDING MACHINERY, TYPES, AND PRINTING MATERIAL.

Report.—Commended for accurate and excellent work in large variety. Originality is not claimed for the type-casting machine, but only such improvements as experience has shown to be necessary to secure the quickest and best results. The types, rules, slotted corners, etc., exhibited show accurate workmanship and special adaptation to printers' requirements. Their specimen-book shows a great variety of tasteful styles of types and borders.

231. **V. Grottenthaler, Philadelphia, Pa., U. S.**

BOXWOOD FOR ENGRAVERS' USE.

Report.—This is an exhibit of boxwood for engravers' use; is in large blocks or in sections with screws. The wood is well selected and well put together. The short screws with ears, with which the blocks are put together, is an improvement and an ingenious device.

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232. **W. H. Windsor, Little Rock, Arkansas, U. S.**

PRINTERS' (FORM) FRAME.

Report.—One of the best principles to close types in a very easy way.

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233. **Standard Machinery Co., Mystic River, Conn., U. S.**

MACHINE FOR ROUNDING AND BACKING BOOKS.

Report.—This machine does by power what is often considered the hardest work of the bindery. The operator has merely to feed the book to the machine, when it is clamped, rounded, and automatically released, ready for the cover. As skilled labor may be dispensed with, the economy of using this machine is considerable.

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234. **Novelty Paper Box Co., Philadelphia, Pa., U. S.**

WIRE STITCHING MACHINES FOR BOOKS AND PAMPHLETS.

Report.—Two machines for stitching pamphlets or books with wire instead of thread. A great novelty in pamphlet binding has been introduced by these clever machines, at once rapid and economical. They can be worked by a novice at the rate of twenty-two per minute, completing the work with great neatness and strength. The patent wire-stitched books display great durability and flexibility, with great economy in production.

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235. **Chambers Brothers, Philadelphia, Pa., U. S.**

BOOK, NEWSPAPER, AND PERIODICAL FOLDER, PASTER, AND TRIMMER.

Report.—The newspaper folder is well made and thoroughly well designed and adapted for printers having a newspaper with a moderate circulation.

The periodical folder can be worked at a speed of one thousand per hour, and does the work very efficiently.

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236. **Wm. Braidwood, New York, N. Y., U. S.**

PERFORATING MACHINE FOR CHECKS, STAMPS, ETC.

Report.—Commended as a perforating machine worked with pins on circular cutter, and cones for stopping at any point. Very fast, and well adapted for stop or through work.

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237. **S. C. Forsaith & Co., Manchester, N. H., U. S.**

NEWSPAPER FOLDING MACHINE.

Report.—Commended for simplicity of its parts, freedom from tapes and belts, and efficiency at a speed of three thousand per hour.

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238. **Wm. Braidwood, New York, N. Y., U. S.**

PAPER FOLDING MACHINE FOR BLANK BOOKS.

Report.—This convenient machine or tool for the binding effects the folding of a small number of sheets at one stroke, for blank books and the like, with a speed and certainty only attainable after long practice by hand folders; it is a simple and cheap labor-saving device. It increases the solidity of blank books.

239. Mary H. Semple, Lowell, Mass., U. S.

BOOK TRIMMING MACHINE.

Report.—The machine was a novelty embodying many useful features when first introduced, and, although long on the market, is still unsurpassed in some of them. The table movement is very ingenious, adapting the machine to the work of trimming a large or small number of books to any desired size within limits.

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240. Charles W. Packer, Philadelphia, Pa., U. S.

MACHINES FOR CUTTING CARDBOARD.

Report.—Commended for the general adaptation of the machine for the work designed. The machine is for the use of paper-box makers, cuts circular or oval with facility, and is easily adjusted for different sizes.

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241. C. C. Child, Boston, Mass., U. S.

PAPER CUTTING MACHINE.

Report.—The machine seems to be peculiarly adapted to perform the miscellaneous work of a bindery. It is self-clamping. The clamp moves with the knife, so that no time is lost. The pressure of the clamp is automatically regulated by the knife, so that no power is thrown away, and the paper is not injured by excessive pressure. The gauge is new and exact, and may be quickly adjusted from the front of the machine. The knife can be instantly stopped during any portion of the cut. The wooden cylinder on which the knife cuts can be quickly changed to give a new cutting surface. The machine is neat, strong, compact, and well finished.

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242. Brown & Carver, Philadelphia, Pa., U. S.

PAPER CUTTER AND ROTARY CARD CUTTER.

Report.—The operating parts of the paper cutter are well fitted and strongly built. The gauge is very accurate, and is adapted to be set close to the knife so as to cut the smallest sheets.

The card cutter will do very rapid work. A plurality of rotating disks on rotating parallel shafts cut past each other with the effect of a shear cut.

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243. George H. Sanborn, New York, N. Y., U. S.

PAPER CUTTING MACHINES.

Report.—These machines are well adapted for heavy work, the larger sizes especially for the use of paper-makers. The friction self-clamping device seems to be sufficiently powerful to secure any reasonable amount of paper. The lever movement, by which slow cut and quick return are secured, is strong and reliable. The stamping and embossing press exhibited in the Campbell Building is strong and well built, and specially adapted for the work intended.

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244. E. R. & T. W. Sheridan, New York, N. Y., U. S.

BOOK SAWING MACHINE.

Report.—The simple expedient of adapting circular saws to cut to a regulated depth in the backs of folded sheets, so as to sink the twine on which the book is sewed, is a device of much practical utility.

245. Holyoke Machine Co., Holyoke, Mass., U. S.

GEORGE W. HAMMOND'S PATENT STOP CUTTER AND A STACK OF SUPER CALENDERS.

Report.—Commended for an improved method of cutting either wet or dry paper square, thereby saving both time and paper. The machine is built in a substantial and workmanlike manner. A stack of super calenders, having strength and beauty of finish, is a noteworthy feature of this exhibit.

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246. Cleveland Paper Box Machine Co., Cleveland, Ohio, U. S.

MACHINE FOR MAKING PAPER BOXES.

Report.—A strongly built, efficient, and rapidly working machine.

This machine makes paper boxes and covers, and also boxes and covers combined, for use as a substitute for the ordinary paper and twine method of putting up packages; does the work well and cheaply.

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247. Clague, Randall, & Co., Rochester, N. Y., U. S.

MACHINE FOR COVERING PAMPHLETS AUTOMATICALLY.

Report.—A well-constructed machine; will cover a pamplet of one sheet only, or twenty sheets thick, at the rate of one thousand to twelve hundred per hour. Boy feeds the covers. Has a very ingenious automatic needle arrangement for feeding pamphlets. Work well finished, and delivered ready for trimming.

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248. W. E. & E. D. Lockwood, Philadelphia, Pa., U. S.

AUTOMATIC ENVELOPE MACHINE.

Report.—It deserves great commendation for originality of design and construction. It is the only machine exhibited that cuts the envelopes from the web of paper. It produces the envelopes complete and ready for use at the rate of one hundred and twenty per minute, on an improved economic principle. An automatic seed-bag-envelope machine was also exhibited, working at the rate of seventy-five per minute, with good result.

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249. Samuel Raynor & Co., New York, N. Y., U. S.

ENVELOPE GUMMING AND FOLDING MACHINE.

Report.—This machine has been well designed and carefully constructed; is very extensively used for the manufacture of envelopes of all ordinary sizes. The arrangement by which the flap of the envelope is gummed by a rolling cylinder is a valuable improvement, securing greater certainty and more regularity in the gumming. The machine requires very little power to drive it, and the attendant has perfect control over all the working parts.

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250. I. Morton Poole & Co., Wilmington, Del., U. S.

PAPER MANUFACTURING MACHINE.

Report.—This exhibit contains a stack of calendering rolls, intended to be part of a complete paper machine. These rolls are of cast iron chilled at the surface in casting and thereby made hard like tempered steel. They are separately ground according to a highly improved plan, and are so true that when placed together they appear to bear upon each other throughout their entire length. Chilled iron calenders of this character are a modern and important improvement for all first-class paper machines.

251. **Lobdell Car Wheel Co., Wilmington, Del., U. S.**

PAPER MAKING MACHINERY.

Report.—This exhibit contains a stack of calendering rolls, intended to be part of a complete paper machine. These rolls are of cast iron chilled at the surface in casting and thereby made hard like tempered steel. They are separately ground according to a highly improved plan, and are so true that when placed together they bear upon each other throughout their entire length. This exhibit has the exceptional merit that the rolls are not only ground true, but cast, by the exhibitor.

252. **Howell & Brothers, Philadelphia, Pa., U. S.**

HANGING-UP MACHINE, CUTTING-OFF AND ROLLING MACHINE, HARDENING MACHINE, ATTACHED TO WALDRON'S WALL-PAPER PRINTING MACHINE.

Report.—These three machines are admirable adjuncts to the wall-paper printing machine, rendering it much more complete and its product more easily marketable.

The paper hangings exhibited show much merit in the harmony and combination of the colors used.

253. **Holyoke Machine Co., Holyoke, Mass., U. S.**

GOULD'S PATENT BEATING ENGINE.

Report.—Commended for economy of space, economy in cost, saving of labor, strength, and durability; and is peculiar in that the stuff requires no stirring by the engineer.

254. **J. R. Osgood & Co., Boston, Mass., U. S.**

HELIOTYPOGRAPHY.

Report.—This exhibit is of a special process of transferring from an ordinary negative a design upon a plate of sensitized gelatine, in such a manner that the said plate can be rapidly printed from, as from a stone. The process renders practicable admirable and cheap printing of copies both from nature and from fine artistic work.

255. **United States Soapstone Manufacturing Co., Cincinnati, Ohio, U. S.**

SOAPSTONE PRODUCTS.

Report.—Commended for a very meritorious display of soapstone stationery articles for school and general trade purposes.

256. **Chamberlin, Whitmore, & Co., New York, N. Y., U. S.**

ENVELOPES, WEDDING STATIONERY, AND VISITING CARDS.

Report.—Commended as being all in the highest order of merit.

257. **Pusey, Jones, & Co., Wilmington, Del., U. S.**

PAPER MANUFACTURING MACHINERY.

Report.—This exhibit contains an expanding pulley for nicely regulating the speed of parts of a paper machine, and which is an important improvement. The plan is simple and effective. Also a stack of calendering rolls, intended to be part of a complete paper machine. These rolls are of cast iron chilled in casting and thereby made hard like tempered steel. They are separately ground according to a highly improved plan, and are so true that when placed together they appear to bear upon each other throughout their entire length. Chilled iron calenders of this character are a modern and important improvement for all first-class paper machines.

258. Gavit Paper Machine Works, Philadelphia, Pa., U. S.

PAPER MAKING MACHINERY.

Report.—Commended for the patent cone pulley paper cutter, which enables the machine to run at a high rate of speed; the open press roll stands being very convenient in putting on and taking off felts; also the improved deckle frame, whereby the deckles may be removed from the machine more conveniently and with less liability to injure the wire cloth; also an improvement known as the one-arm pulp dresser. Commended for convenience, strength, durability, and ability to meet the demand for running a paper machine at a high rate of speed; also for a stack of web super calenders which combines strength, finish, and economy in cost.

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259. Alois Winkler, Vienna, Austria.

METALLIC LETTERS AND SIGNS.

Report.—The metallic letters and titles inlaid with mother of pearl, gold, and colored, are tasteful and durable, and therefore useful for making show-cards, titles, etc.

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260. United States Stamped Envelope Works, Hartford, Conn., U. S.

MACHINE FOR GUMMING, EMBOSSING, FOLDING, AND COUNTING ENVELOPES.

Report.—This machine has been constructed with great care and finish. The work is completed in an excellent and perfect manner. It is the only machine in the Exhibition which completes the envelope with an embossed colored die at one operation.

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261. Socios de la Peña, Bilbao, Spain.

CIGARETTE PAPERS.

Report.—It is an exhibit of cigarette papers manufactured from both linen and straw, of various qualities, from common to superfine; plain, medicated, and tobacco-flavored, and finished both with and without sizing. These papers are notable for their strength and pliability, and, by reason of their variety, combine the qualities required by the various markets of the world.

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262. Bureau of Engraving and Printing, United States Treasury Department, Washington, D. C., U. S.

ENGRAVING, PRINTING, AND COMPOSITION.

Report.—This exhibit embraces:

1. Specimens of engraving of letters, vignettes, counters, and other designs of bank note character, suitable for bonds, bank notes, stamps, checks, and other securities.

2. Specimens showing the character of the printing of the same.

3. Illustrations of a new process for cheaply composing plates for the printing of securities, checks, cards, bill heads, in a style much superior to that commonly adopted, and at a comparatively trifling cost.

The specimens of engraving exhibited are according to the highest present standard of art in design and execution, and are worthy of the national institution within which they have been elaborated.

The printing is perfectly done, and bears witness to the employment of the best skill and materials, and of highly improved machinery and process.

The whole exhibit is highly meritorious.

SIGNING JUDGES OF GROUP XIII.

The numbers annexed to the names of the Judges indicate the reports written by them respectively.

WM. FAXON, 1, 2, 3, 9, 10, 11, 12, 13, 14, 23, 24, 25, 26, 138, 188, 191, 192, 193, 195, 196, 197, 207, 218, 220, 221, 222, 227, 228, 230, 237, 240, 246.

SYDNEY H. WATERLOW, 4, 5, 6, 7, 8, 15, 16, 17, 18, 19, 28, 31, 37, 58, 194, 198, 199, 200, 201, 203, 204, 205, 206, 208, 210, 211, 212, 213, 214, 216, 217, 224, 229, 234, 235, 236, 247, 248, 249, 252, 260.

EDWARD CONLEY, 20, 21, 22, 27, 29, 60, 70, 71, 102, 137, 139, 140, 141, 142, 143, 145, 146, 148, 149, 152, 154, 158, 163, 164, 165, 245, 253, 258.

JAMES M. WILLCOX, 30, 32, 33, 34, 35, 36, 38, 39, 41, 43, 44, 45, 46, 49, 50, 51, 52, 53, 54, 55, 56, 57, 61, 62, 63, 64, 65, 66, 67, 68, 69, 72, 73, 108, 109, 111, 113, 114, 115, 116, 117, 118, 119, 120, 135, 159, 161, 162, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 183, 184, 185, 186, 187, 190, 250, 251, 254, 257, 261, 262.

C. O. CHAPIN, 40, 42, 47, 48, 59, 74, 75, 76, 77, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 103, 104, 105, 106, 107, 112, 121, 122, 123, 125, 127, 128, 130, 134, 147, 223, 226, 255, 256.

GUSTAV SEITZ, 78, 129, 131, 132, 133, 144, 150, 151, 153, 155, 156, 157, 160, 182, 189, 232, 259.

H. T. BRIAN, 110, 124, 126, 136, 202, 209, 215, 219, 225, 231, 233, 238, 239, 241, 242, 243, 244.

SUPPLEMENT TO GROUP XIII.

REPORTS

OF

JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.
COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

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1. A. M. Collins, Son, & Co., Philadelphia, Pa., U. S.

CARD MOUNTS IN VARIOUS STYLES FOR PHOTOGRAPHS.

Report.—Bevel-edge cards for "Glace" pictures; card mounts with border lines and scroll-work; illuminated back of carte de visite mounts; all tasteful in design, of good quality and superior workmanship.

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2. Samuel Loag, Philadelphia, Pa., U. S.

SAMPLES OF FINE COLOR PRINTING.

Report.—Commended for a fine display of printing in colors; illuminated title-pages of books, rich in design and well printed; register clean, colors fine.

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3. J. M. Armstrong, Philadelphia, Pa., U. S.

MUSIC TYPOGRAPHY.

Report.—Commended for clean cut and clearness of type-work in all the varieties of the exhibit.

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4. Lehman & Bolton, Philadelphia, Pa., U. S.

COMMERCIAL LITHOGRAPHY.

Report.—Commended for originality of design and fine workmanship.

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5. C. A. Dixon & Co., Philadelphia, Pa., U. S.

COLLEGE STATIONERY.

Report.—Commended for good design and workmanship on "college commencement invitations."

6. **The Wells & Hope Company, Philadelphia, Pa., U. S.**

CHROMO-LITHOGRAPHIC IRON SHOW CARDS.

Report.—Commended for durability and workmanship, fitness for the purposes intended, and adaptation to public wants.

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7. **Chas. Bormet & Co., Geneva, Switzerland.**

WOOD TYPE.

Report.—Commended for good design and workmanship.

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8. **George Waterston & Son, Edinburgh, Scotland.**

SEALING WAX.

Report.—Commended for superior adhesiveness, color, and hardness in hot climates; also for minimum waste in melting in a flame.

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9. **S. F. Gratz, Birmingham, England.**

REVOLVING BRASS WHEEL NUMBERING AND DATING STAMPS.

Report.—Commended for ingenuity, utility, and ease of manipulation. This stamp can be used for various purposes; and is so arranged as to be interchangeable, with little chance of losing the parts or disarranging them.

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10. **Stephenson, Blake, & Co., Sheffield and London, England.**

SPECIMEN SHEETS OF PRINTING TYPE.

Report.—Commended for great variety of "book faces" good. Old-style book face very good.

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11. **Munkedal Manufacturing Co., Uddevalla, Sweden.**

PAPER.

Report.—Cheap papers in different colors; well adapted for cheap wall paper.

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12. **Malmö Wood Pulp Manufacturing Co., Delary, Sweden.**

CHEMICALLY PREPARED WOOD PULP.

Report.—Commended for bright color and strong fibre for paper pulp.

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13. **Chr. Christophersen, Christiania, Norway.**

CHEMICALLY PREPARED WOOD PULP.

Report.—A good quality of ground wood pulp.

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14. **A. O. Hamborg, Christiania, Norway.**

GROUND WOOD PULP.

Report.—A good quality of wood pulp, mechanically prepared.

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15. **Bravo & Co., Chili.**

PAPER.

Report.—This is an exhibit of wrapping and colored poster papers, well made and of good strong texture.

16. **J. Franaszek, Warsaw, Russia.**

PAPER HANGINGS.

Report.—Commended for cheapness and variety in styles.

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17. **J. K. Frenkel & Sons, Tammerfors, Russia.**

PAPER.

Report.—This is an exhibit of writing paper of good strong texture and well sized.

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18. **Prado Paper-Mill Co., Thomar, Portugal.**

PAPER.

Report.—Writing and wrapping paper, of good quality; the writing paper well sized.

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19. **Samuel Ramsden, Melbourne, Victoria, Australia.**

PAPER.

Report.—News and wrapping paper, of good quality, made of native fibres.

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20. **Nynäs Pasteboard Factory, Mavida, Sweden.**

PASTEBOARD (WOOD).

Report.—A stiff and smooth pasteboard, made from wood pulp.

---

21. **C. G. Mineur, Stockholm, Sweden.**

WALL PAPER—IMITATION OF LEATHER, AND DECORATIVE CARVINGS IN WOOD PULP.

Report.—Imitations of leather in embossed paper, painted and gilded to imitate antique embossed leather. Strong and well executed, with rich design. Also paper-pulp ornaments. Commended for cheapness and general adaptability to the uses intended. They are much lighter than plaster ornaments, which they resemble, and are readily applied in decorations.

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22. **Sten Lewenhaupt, Wermbohl, Sweden.**

CHEMICALLY PREPARED WOOD PULP.

Report.—A good, long, and strong fibre for paper stock.

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23. **Potsdamer & Co., Philadelphia, Pa., U. S.**

COMMERCIAL LITHOGRAPHY.

Report.—Commended for beauty of design and excellence in Spencerian scrip and bank work.

SIGNING JUDGES OF SUPPLEMENT TO GROUP XIII.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

COLEMAN SELLERS, 1, 2, 6, 9, 10, 21.
H. K. OLIVER, 3.
EDWARD CONLEY, 4, 5, 7, 8, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23.

United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP XIV.

EDITED BY
FRANCIS A. WALKER,
CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:
J. B. LIPPINCOTT & CO.
1878.

Entered, according to Act of Congress, in the year 1876, by the
CENTENNIAL BOARD OF FINANCE,
In the Office of the Librarian of Congress at Washington.

SYSTEM OF AWARDS

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

* * * * * * * * * * *

Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respectively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP XIV.

JUDGES.

AMERICAN.

CHRISTOPHER C. COX, Washington, D. C.

AZEL AMES, JR., Wakefield, Mass.

DOUGLAS GALTON was temporarily assigned from Group XVIII to assist in the examination of Ventilation, etc.

GROUP XIV.

APPARATUS OF HEATING, LIGHTING, VENTILATION, WATER-SUPPLY, AND DRAINAGE.

CLASS 222.—Apparatus and fixtures for heating and cooking,—stoves, ranges, heaters, etc.

Fire-places, grates and fixtures, for burning wood, coal, or gas.

Hot-air furnaces, steam heaters, hot-water heaters, radiators, etc.

Stoves, cooking stoves, kitchen ranges, ovens, and fixed apparatus of cooking.

CLASS 224.—Kitchen and pantry utensils, tin-ware, and apparatus used in cooking (exclusive of cutlery).

CLASS 223.—Apparatus for lighting,—gas fixtures, lamps, etc.

Ventilating apparatus.

Water-supply apparatus,—pipes, faucets, filters, hot-water boilers, water-backs, and plumbers' goods generally.

Drainage,—pipes, traps, and sewer connections, and apparatus.

Abattoirs and accessories, including apparatus for the utilization of animal waste, exclusive of fish.

Disinfectants, in their sanitary applications.

CLASS 224.—Refrigerators.

GENERAL REPORT

OF THE

JUDGES OF GROUP XIV.

INTERNATIONAL EXHIBITION,
Philadelphia, 1876.

PROF. FRANCIS A. WALKER, *Chief of Bureau of Awards:*

SIR,—I send you herewith the report of the Judges of this Group upon heating, lighting, and sanitary appliances, etc.

Respectfully yours,

AZEL AMES, JR.

GROUP XIV.

APPARATUS FOR HEATING, LIGHTING, VENTILATION, WATER-SUPPLY, DRAINAGE, ETC.

BY AZEL AMES, JR.

To Group XIV. was assigned the consideration of the appliances involved in the sanitary systems affecting the abodes, sustenance, and occupations of man. It is matter of regret that the group, embracing in its purview so important and varied an exhibit, should have been composed of but two members, except as, by their request, foreign members of the Board were from time to time temporarily added; such additions, however, giving the group, as well as the exhibitors, the advantage of the valuable services of Sir Sidney H. Waterlow, of Group XIII., on drainage exhibits; Captain Douglas Galton, F.R.S., of Group XVIII., on heating and ventilation exhibits; and Dr. C. B. White, of Group XXIV., on odorless excavating apparatus.

In few departments of our social system have more or greater improvements or radical advances been made during the last century than in the directions indicated by the general terms heating, lighting, ventilation, water-supply, drainage, etc. Under these several heads there were presented two hundred and fifty-two exhibits, by far the larger percentage being of American production. Indeed, it is to be greatly regretted, in view of the present lively interest in all sanitary matters, that Great Britain and other nations whose sanitary experiences have produced many appliances should not have been more generous contributors to the Exhibition.

It is designed in this report to cursorily review:

a. The purpose of the efforts essayed in the systems enumerated, as chiefly comprising the range of what is known as sanitary science.

b. The advance during the century, as shown by the Exhibition.

c. The contributions presented in the Exhibition as the results of such efforts and advance, the points therein considered in determining their relative excellence according to the assumed standard, and the

requisites deemed essential to secure for them recognition as approved appliances in their respective fields.

d. The tendency of present efforts in the same directions, and that probable in the future.

For the sake of convenience in reference, the classification given by the Bureau of Awards is adopted in the consideration of the several sub-divisions.

The first of these, being Class 222, embraces apparatus and fixtures for heating and cooking,—stoves, ranges, heaters, etc.

In sanitary matters, except in the department of cookery, the word "warming" signifies more correctly than the term "heating" the condition sought; and inasmuch as the provision for the warming of apartments depends, not so much upon their cubic contents as upon the amount of fresh air supplied them and its removal, it is well-nigh impossible to disassociate warming and ventilation. By the classification adopted, however, the latter is referred to another class, and must be considered as incidental.

WARMING.

The bent of the efforts made in all plans for the warming of man's habitation may be briefly said to have been the maintenance of a degree of temperature most conducive to health and comfort, under conditions of least expense, greatest convenience, freedom from deleterious contamination, and efficiency in the promotion of ventilation.

The advance made in this direction during the century closing with 1875 has, perhaps, been equaled in no department of domestic life. At the opening of the century the universal method of house-warming throughout the civilized world, subject only to trifling variations, was the open fire-place extending into the chimney-throat, occupying a large space in the dwelling, and having its wasteful combustion fed by peat, turf, and wood.

The progress of the decades has witnessed in more or less rapid succession, in this country, the advent of the ventilating fire-place or "Franklin Stove," the cast- or sheet-iron cylinders in their crudity, the "box stove," the "air-tight," the more elegant elaborations of cast and rolled metal in stove form, the open grate, the cast-iron and sheet-iron furnace, the steam-coil and radiator, the hot-water heater, and the gas stove, log, radiator, etc., with all the multiple attachments and appliances of each. In Europe the earlier forms of iron and earthen fire-chambers, the porcelain stoves, and the open grate, led to the brass and tile stoves, and the later productions in metal

for burning wood and coal. The substitution of coal and its products for wood as fuel led to great changes and advances in the warming of dwellings. So generally has this substitution been effected that appliances for wood-burning only are rarely presented, and the Exhibition furnished but two such examples, one being a foreign exhibit. The earlier agencies of warming naturally claim consideration first.

FIRE-PLACES, GRATES, AND FIXTURES FOR BURNING WOOD, COAL, OR GAS.

As with the use of the old-time wood- or peat-burning fire on the hearth, the great disadvantage was found to be the loss of a large proportion of the heat evolved, all earlier efforts at improved appliances naturally took the direction of securing a greater return of heat for the expenditure of fuel,—a desideratum, of course, never lost sight of in later undertakings, though the introduction of anthracite, lignite, and bituminous coal has necessitated a principal regard for the character of elements of combustion in new form. Their control, convenient manipulation, and the attractiveness of appliances have become associate desiderata.

"The Franklin Stove," the first of the several steps in the succession which has brought about the widely varied and numerous apparatus represented at the Exhibition, was subject also to the charge of much loss of heat, and most of the provisions for open fires which have followed, whether for wood or coal, have been more or less open to this objection. The open coal-grate of the earlier patterns secured to the warmth of the room only from 12 to 17 per cent. of the total result of combustion, and it is only within the last twenty years that the principles which were enunciated by Desaguliers 130 years ago, by Morin and Du Chalet, and were given their simplest adaptation by Captain Douglas Galton in an open ventilating fire-place grate, have been fully recognized.

Two examples of the adaptation of this principle—which provides for the thorough warming of fresh air around the grate and its subsequent discharge into the apartment—were exhibited at Philadelphia, one of them of English manufacture, and built to express Captain Galton's views, the other, an American modification, in stove form, possessing the advantage of being portable. The genial glow of the open fire, its value as a ventilating agent, and its comparatively small outlay in fixtures, render it naturally a favorite, and it is gratifying to know that alone, or as an auxiliary, it can now be obtained in a form to secure an economical result from its fuel, and genuine aid in the ventilation of the apartment; while not the least satisfactory of its

recently-added features is its provision for use with a descending flue, whereby its presence is made possible under circumstances which must otherwise exclude it.

The eight different exhibits of fire-place grates and two of open-grate stoves furnished seven examples only that were deemed to hold the essentials for their class in such degree as to entitle them to recognition and award.

These requisites were: first, such arrangement of drafts and setting as should secure a fair degree of the results of combustion; second, provision for ventilating action by the indirect method; and third, general availability by an ascending or descending flue. Further points of advantage, in workmanship, artistic construction and effect, special devices for the care of ashes, and fine finish, were of course considered in the making up of an award. It may be said in brief that, the nearer the fire-place, grate, or fixture becomes the embodiment of the principles existing in the grate of Galton among permanent fixtures, and the "Fire on the Hearth" open-ventilating stove of New York in portable form, the more completely are its purposes fulfilled.

The larger use of the fire-place and open grate in Great Britain and through Continental Europe has, as might be expected, made their construction and adaptation in all features more familiar and perfect there; and although in elegance of mountings and finish the American products were of superior character, and New York and Philadelphia vied with each other in beauty and expense of elaboration, the exhibits of Great Britain possessed evidence of fidelity in construction to a greater degree. The marked advance in all apparatus of this class is unmistakably found in a greater regard for the economy of heat, the more scientific supply and disposal of its air-currents, and in provision for a wider application of its advantages. The direction of future improvements, as suggested by those already accomplished, is likely to be toward greater economy of heat and larger availability. That the effect of the exhibit of these goods at the Exhibition, although limited in extent, was favorable to their more general use, at least as auxiliaries, cannot be doubted. The improved methods of induction of air and removal of ash, and hence the lessened annoyance from flying particles, remove their chief objections, other than their want of economy. In a climate where there are seasons of severe cold it is hardly to be expected that they will become other than genial aids to the warming of dwellings.

Among the new and useful methods of warming which the introduction of coal as fuel has brought with it is that of the combustion

of gas as fuel, either as the product of coal itself, or as produced from other sources, as wood, rosin, oil, coal-tar, etc. Although the use of coal-gas as an illuminator undoubtedly somewhat antedates the general substitution of coal for other fuel, it does not appear that gas has been utilized to any extent as an agent of combustion for the purpose of warming until within the last two decades.

The demand for means of producing heat in very small compass, with trifling labor and least delay, and especially in conditions where none of the other forms of warming apparatus could well be applied, has served to bring the burning of gas as a source of heat into very wide and rapidly-extending use, more particularly under circumstances where expense is less of an objection than a larger fire or more cumbrous appliances.

The construction of conveniences for simple heating, as of water or food, by attachments to illuminating fixtures, undoubtedly somewhat preceded the larger employment of gas, either for general cooking purposes or for warming. The natural succession has been the construction of apparatus for intense and direct heat for the preparation of food, and for continued and diffused heat for warming alone. Such apparatus has taken shape in a wide range of gas-stoves, designed and adapted for their special uses; gas reflectors or radiators; and special fixtures for heating in the form of gas-logs, so called, being semblances of fuel in log form in metal, asbestos, etc., and supplied with gas piping, for fire-place use. Such use of gas, and hence the manufacture of conveniences therefor, appear to be in the main confined to the United States, especially as regards the larger forms of apparatus. Of the eight different exhibits of gas-stoves and gas-logs made at the Exhibition, purely as such, all but one were presented by American manufacturers; a determination no doubt owing to the fact that as thus far coal-gas (principally from its being most ready of access) has been chiefly used, and as both the comparative scarcity of coal itself and its higher cost of production augment the cost of its products abroad, a general demand in this line has not yet been created. It is yet matter of some doubt whether the products of combustion, as occurring under circumstances where the direct flames of the burning gas impinge upon metal surfaces, are not the source of contamination from the large number of particles set free, which more or less seriously affect the air of our rooms. The requisites deemed essential to secure approval and award were such thorough construction of parts as to render the escape of gas before reaching the burner impossible, such adjustment of jets as to secure a full supply of oxygen to the flame, and such disposition of the

flame as to prevent the super-heating of large metal surfaces. The gas-stoves manufactured at Philadelphia in a variety of forms have the serviceable and attractive feature, as applied to warming purposes, of a burnished reflecting surface, heightening in marked degree the radiating power, and lending an effect of geniality, of which this form of heating apparatus was previously quite barren. It is probable that the efforts which are now being made, and have been made, to increase the completeness of combustion and the radiating effect will be in the future the direction in which improvement will be made. That an abundant supply of the cheaper gases for consumption in this way may yet be furnished in convenient form, is also a desideratum toward which effort will no doubt be directed. A lessened cost of fixtures is also to be aimed at. The gas obtained from the volatilization of certain hydrocarbonaceous oils, etc., and the fixtures adapted for its use, either for warming or cooking, might properly be considered here; but, as for the most part they are directed to the latter service, and as the fuel is supplied not as gas but in other forms, they are perhaps more appropriately considered in another connection.

The introduction of this agent of house-warming is to be considered as essentially American, and as belonging to the more recent achievements of its class; while its features as furnishing a delightful glow and radiance, and hence comfort and safety, in circumstances where either conditions or expense would prohibit other means of securing like results, give it rank as an advance of very considerable merit; and when additionally secured against all sanitary objection, it must be counted an adjunct of "health, comfort, and convenience" of much worth.

HOT-AIR FURNACES, STEAM HEATERS, HOT-WATER HEATERS, RADIATORS, ETC.

The demands for a larger volume and a better conservation of heat than the conditions of fire-place warming permitted, appear to have led at an early day to the design of close receptacles for fire and the radiation of warmth. Early Chinese literature gives suggestions of efforts in this direction. In Rome, in the days of the Empire, the *stuba*, or stove, seems to have been used as a fixed appliance for baths, and in Scandinavia and Germany for heating baths and hot-houses.

During the Middle Ages stoves appear, despite the retarded progress of the time, to have been advanced to employment in the general warming of habitations. In their construction economy of fuel was evidently a chief consideration. They were made large and deep,

often occupying the whole of one side of a room, being constructed of brick, tile, slate, and undoubtedly sometimes of steatite or soapstone. Attempts at more elaborate construction resulted in the employment of porcelain for highly-decorated tile fronts, tower shapes, and the building of niches for statues of porcelain or bisque. In all the fire was placed near the floor, and the heat and smoke caused to circulate through several flues before final exit. They have undergone in some countries but comparatively little modification since their earlier construction, except in the directions of portability, size, and nicer relation of parts.

The Exhibition furnished in the Swedish department a later specimen of this porcelain architecture. Provision for a large supply of fuel at one feeding was in some forms a prominent feature. Probably, excepting some slight and vague reference to the labors of an Italian monk in the seventeenth century toward the creation of an iron heater, and one or two interpretations of earlier Latin authors with reference to closed brass receptacles for fire, as heaters, there is no earlier mention of attempts at the production of closed fire-places of metal than of those of the Cardinal Polignac, of France, in 1709, O. S. Under the *nom de plume* of Gauger, the cardinal in that year published a treatise, entitled *La Mècanique du Fer, ou l'Art d'en augmenter les Effets, et d'en deminner la Defense.*

The Polignac fire-places had hollow walls, heaters, and iron jambs, the chief effort clearly being to economize heat. In 1716 the work of Desaguliers was undertaken, his improvements being based upon the invention of Polignac, whose treatise he translated. In 1722 the so-called "hollowed stoves," the progenitors of the whole race of "box stoves," were introduced. Certain German improvements in iron fire-boxes appeared about 1740. In 1745 Benjamin Franklin invented his great improvement, a fire-place capable of being entirely closed, with a downward draught, passing the heat through side flues till the little not utilized escaped with the smoke through a rear flue in the chimney base; a sheet-iron "damper" in the descending flue controlling the fire. The successive inventions of Franklin subsequent to 1770 greatly increased the range of close heaters, and the prototypes of the later "base-burner" and "bituminous smoke-consuming furnace" were among these. In 1785 the labors in this direction of that wonderful man, Benjamin Thompson, better known as Count Rumford, began, and in connection with those of Franklin established the principles since recognized as essential in all heating apparatus.

In all the chief end has been the better economy of fuel and heat,

associated with conditions of convenience and attractiveness. The labors of these two men may fairly be said to have furnished the foundation for the marked supremacy of America in all heating apparatus. Up to 1812 the fuel consumed both in Europe and America being principally either wood or bituminous coal, the long list of special adaptations for anthracite, then considered "incombustible refuse," had not been undertaken.* Their stimulus was found in the cutting off of the supply of foreign coals for American manufactures during the war with Great Britain, in the year named, and a necessary recourse to the home fields of anthracite. Thus much for the genesis of the apparatus which has its relation chiefly to the warming of our dwellings. The extensive and varied exhibit of heating apparatus at the International Exhibition of 1876 may be considered simply the multiplied development of the principles and conditions which in the main had been established in 1830, nearly half a century previous. It is clear, then, that requirements of economy in fuel and heat, and the demand for a larger volume of heat susceptible of direction at will, with the desire to dispense with numerous fires and to remove the source of warmth without the apartment, have been the stimulus of the design, since the advent of coal as fuel, of various apparatus which should serve as central sources of heat, so arranged as to permit the distribution of warmth to designated apartments. Of this class the hot-air furnace is largely in preponderance, and of this form of warming apparatus the Exhibition of 1876 undoubtedly presented the largest and finest representation ever brought together.

"The hot-air furnace," says Dr. Derby, "is but a stove in another form." The earliest definite mention of an apparatus having a prominent feature of furnaces, viz., its partial location and arrangements for the supply of fuel outside of the apartment to be warmed, is perhaps found in the somewhat obscure reference, in Bunyan's *Pilgrim's Progress*, to what Christian saw in the House of the Interpreter, which would seem to make its use antedate 1650. Dr. Franklin mentions in 1745, as a German invention of that date, "an iron box, made of five plates fastened together with screws, one side of which was left open, but when the box was set, this open side, with the smoke-pipe, was in an ante-room, while the body of the same projected through the partition to warm a larger room, the fire being fed and the smoke conducted off in the ante-room." Hot-air furnaces may in brief be

* The Chinese had, with their earlier discovery of the value of coal, made some use of it, which is but vaguely recorded.

considered as more or less thoroughly encased stoves, placed outside the apartment to be warmed, and communicating their heat through conducting pipes. They act indirectly by warming air which passes from them into rooms, and which should be drawn only from one source—the fresh supply out of doors. As being simply readjustments and elaborations of stove forms, the early history of stoves is also theirs, and their separate consideration is incident only to their later progress and special devices.

The requirements of a furnace *per se* are determined by certain well-ascertained data in chemistry, metallurgy, and philosophy, and as from time to time these data have been established, the effort in the construction of hot-air furnaces has been to give them recognition and adaptation.

Some of these determining facts, as affecting construction and associate conditions, are worthy of brief enumeration as the *rationale* of the somewhat rigorous demands made by this group of Judges upon all furnaces exhibited. We note among them,—

1. The ascertained power of very highly heated metal and other surfaces to slightly abstract the moisture from the atmosphere—in other words, to promote evaporation and to certainly change the relative humidity of the air by expansion.

2. The ascertained capacity of combustion to produce from fuel, notably from anthracite coal, large amounts of carbonic acid and carbonic oxide gases, with sulphurous acid and water vapor.

3. The fact that, when the combustion of anthracite is complete, the products are carbonic acid gas and water with slight sulphur fumes.

4. The fact that combustion rarely is complete in heating appliances, and never unless the supply of air passing over and through the fire is abundant.

5. The fact that carefully conducted experiments by such scientists as Bernard, Guerand, Taylor, Watts, Leblanc, and Chenot, show that carbonic acid to some extent, and carbonic oxide to a powerful degree, are, when respired, either of them alone, but especially when mixed, of the character of narcotic poisons.

6. The certainty, as established by St. Claire Deville and Troost, of the French Academy, that certain metals, especially cast-iron, when heated to a dull red heat, permit the passage of gases directly through their substance, owing to the arrangement of their molecules or atoms.

7. The fact that, from the expansions and contractions occurring under the alternations of high and low degrees of heat, iron castings must be more or less poorly in coaptation, the passage of gases

through their joints being but little retarded, while cast-iron is also noticeably defective and porous in structure.

8. The fact that the denser metals, like wrought-iron, contain a large per cent. of carbonic oxide,—a fact which, though its relations are not yet understood, seems in some way to facilitate the passage of the carbonic oxide produced in combustion into dwellings.

The effort of the group, in view of these determinations of science, became chiefly to seek for the most successful adaptations of the principles involved, and to bestow highest commendation upon such as should possess them in the highest degree with the best associate conditions of convenience and economy. To this end it was determined to require of any hot-air furnace that to receive fullest commendation it should combine the following features:

1. It must be arranged for taking its supply of fresh air from outdoors, because only such fresh air is fit for supply to dwelling-apartments.

2. It must, to be most satisfactory, have least interference with free combustion and the escape of the product of combustion into the chimney, *i.e.*, no damper in the smoke flue, and no provision for the cooling of the flue by admission of air between the fire and chimney, *e.g.*, as by a regulator; because to secure the removal of the dangerous elements, especially carbonic oxide gas, complete combustion, and hence ready conversion into and utility as carbonic acid gas, must be retarded by no agencies like these.

3. It must have its dome of wrought-iron, thoroughly bolted. First, because of its avoidance of leaks in joints; and, second, because of its apparently lesser permeability to gases under heat.

4. It must have good castings, and, so far as possible, horizontal joints. Because, first, the necessity for the absence of "pin holes" and like defective structure is apparent; and, second, because there is less expansion and contraction, and less separation and escape of gases, with horizontal than with vertical joints, and "fittings" are more perfect.

5. It must have only fire-brick or soapstone walls in contact with its fire. First, because of the lessened evaporation thus caused; second, because the dull red heat of iron, so productive of carbonic oxide, is thus avoided; and, third, because of the absence of gas-escape as occurring with the cast-iron pot.

6. It must have the most ample provision for the direct supply of air through and above the fire-pot, so arranged as to best impinge upon the combustion points. Because of the absolute necessity for its presence to effect complete combustion, and hence the most rapid

conversion of carbon into carbonic acid gas, and the largest economy of fuel.

7. It must provide for a sufficient supply of moisture. First, because in no other way can the tendency to evaporation, from the atmosphere which, under some conditions and in some climates, the furnace induces, be counteracted; and, second, because this element is imperatively demanded for conditions of health.

8. It must have a large cylinder as proportioned to the fire-pot. Because thereby the avoidance of a high temperature of the over-arched iron is aided.

9. It should, if the previously named conditions are fully secured, be provided with a non-conducting fire-proof encasement, as of hollow tile, brick, or similar substance, for the conservation of locally radiated heat; but not unless these conditions are secure. First, because such conservation is a prime feature of economy, a point which must always operate with either the purchaser or the scientist for obvious reasons. Second, because thereby the heating of the cellar, where furnaces are generally located, is, as a rule, undesirable, beyond the point of simple dryness; and, lastly, the reason for not having such encasement unless the dome be tight, etc. (see 1, 2, 3, 4, 5, 6, 7, and 8), is that the escape of deleterious gases into the larger area and more ample dilution of oxygen in the cellar, and freer exit to open air, must be far preferable to their concentrated conduct to the living-apartments above.

10. It should have the most effective and convenient arrangement for the abstraction of clinkers and stirring up of the fire mass. First, because of the better combustion thereby secured; and, second, because of the more even and better regulation of temperature, in addition to the merits of ease in its care.

11. It should combine the fullest and at the same time the simplest appliances for the control and removal of ashes, dust, and soot, as matters of convenience and as promoting the efficiency of the furnace.

Of hot-air furnaces used purely as heaters the exhibit at the Exhibition of 1876 was distinctively American, Europeans not having as yet adopted to any extent this agency of house-warming.

The earlier forms of American furnaces appear to have mainly had their origin in the vicinity of the anthracite coal fields. Of the furnaces exhibited, the half-score considered worthy of award were nearly all designed and manufactured east of the anthracite regions. The earliest full recognition of the requirements of the furnace,

that it be of the closest construction and least permeability, seems to have been found at the hands of a Philadelphian, Jesse Reynolds, about the year 1853; and the features then adopted of wrought-iron riveted domes had their expression in connection with furnaces built by him and his associates, and are still continued. Multiplied modifications of this and other forms in later years have been brought forward, and had large representation at the Exhibition.*

All things considered, the nearest expression of the sanitary requirements indicated, the fullest economic provision, and the best and most nearly automatic appliances for the care of ashes, dust, etc., in a furnace, seem to be assembled in that manufactured by the Magee Furnace Company, of Boston, for the burning of anthracite, and that of Reynolds & Son, of Philadelphia. The former provides by ample inducts for fresh "out of doors" air in large volume, controls the inlet of air beneath the fire, and has the largest supply directly to the fire-mass; has a large wrought dome, very superior castings and joints, fire-brick lining, well pierced for air, facilitating quick conversion of fuel, and some regard for moisture. Its arrangements for the care of clinkers, ashes, and soot are peculiarly good; while its double-wall terra-cotta encasement is unique. Its deficiencies are first, the use of the "damper" and the "regulator," both of which might easily be dispensed with, as its control of fresh air below the fire is readily made complete; and second, its want, like most other heaters, of proper means of securing humidity, by passing its warmed air above water after leaving the furnace-dome. It may be considered the nearest present approach to what a furnace should be, and, with the improvements suggested, constitutes a standard realization of the scientific requisites in its class. For the consumption of bituminous coal and wood, the furnaces constructed by the Reynolds and others of Philadelphia possess the required variations from the anthracite standard in most satisfactory form, and are the best expression of the advance made during the century in this direction. The furnace, for anthracite, of Reynolds & Son excels in its superior and unique provisions for the control of the air-current beneath the fire, being prac-

* The earliest construction of the wrought-iron dome furnace is in some doubt. Various claims are laid to it. Dr. S. G. Howe, of Boston, early had one constructed for his own use. The riveted boiler-iron dome was certainly in use in Philadelphia as early as 1833, and was used in New York at about the same time. The largest recognition of its value seems to have been arrived at by Reynolds, in connection with his other devices, about 1853, and received great impetus from the advocacy of Dr. Nichols, of Haverhill, Massachusetts, some few years later. The experiments made by foreign *savans* do not appear to have received much recognition at American hands until recent years, although published some fifteen or twenty years since.

tically air-tight at will, and in having no damper or cooling draft between the fire and the chimney; in the shape, size, and construction of its fire-pot, and its unequaled "cutting and grinding grate."

The drift of that advance in this subdivision of heating apparatus, it was evident from the entire range of exhibits at Philadelphia, has been toward, first, security from the danger and loss shown to be incident to combustion, especially of anthracite coal, under such conditions; second, larger conservation of heat; and third, convenience—an order of precedence eminently proper and desirable. That a like bent and purpose will shape the efforts of the future in this connection there can be no doubt, the relative order of importance being held the same. In the line of greater sanitary advance the effort, it is believed, will be to secure better methods of controlling the air as it enters below the fire, abolishing thereby the necessity and use of the damper and regulator; while it is also probable that satisfactory appliances for causing the warmed air to receive moisture as it enters the apartment will be introduced. In the direction of the larger economy of fuel and heat in bituminous-burning heaters, better results in the combustion of smoke and the conservation of dissipated heat are likely to be the event; while in the whole class of furnaces and heaters it is not improbable that the effort at economy of fuel will take on the feature of the use of fuel in finer subdivision, that the conversion into the immediate elements of combustion may be more rapid, and hence economical. This feature in time may be carried to the point of supplying carbonic acid gas, as such, as a substitute for its crude sources, the elaboration simply being performed elsewhere, and in such amount as to effect great saving. If the large expense incident to such a system can be overcome, there appears to be little else to hinder its advent. The still better introduction of air to the fire-mass is a probable aid to fuel-economy. The better conservation of heat is sure of promotion in the future, by the freer use of the many new and invaluable non-conductors, in which the Exhibition was rich, especially for walls, for both retaining and conducting the heat locally radiated.

Among the items of future improved convenience, apparatus for the still better disposal of ashes, dust, and soot will be sought; and although it is difficult to conceive of better aids in the cutting and removal of clinkers than the grates exhibited by Reynolds & Son and Bissell & Co., so long as their removal is laborious the effort at greater facility will no doubt be made.

Comparing the old methods, the amount of fuel they required, small heat evolved, and the degree of comfort derived, there was

shown in the Exhibition a most gratifying progress, of which Americans especially have a right to be proud.

STEAM AND HOT-WATER HEATERS, RADIATORS, OIL STOVES.

The scientific demonstration of the wasteful and deleterious features of old and imperfect methods of hot-air warming in dwellings, and the common appreciation of these defects, led to the development and introduction of steam and hot-water systems. Being free from the dangers shown to be connected with the use of hot air, on the score of health, both hot-water and steam pipes, when correctly adapted, are unobjectionable. They furnish an abundant supply of fresh air properly warmed and free from the risk of contamination by the products of combustion. Both require especial care in construction and location, to prevent damage from leakage and freezing. The prime requisite in a system involving the use of either is that the coils through which the air is inducted to be warmed by the water or steam should be situated outside the apartment warmed, preferably beneath them; and that the warmed air should be distributed thence, and not by direct radiation in the rooms themselves.

The expense which debars these systems from common use has limited them to comparatively small demand, and hence narrow range, the representation at Philadelphia being chiefly American, although foreign exhibitors were not wanting. It is to be regretted, however, that the plan of employing direct radiators in the rooms to be heated is the more common one, involving as it does disregard of sanitary needs, and too frequently appliances at once dangerous, noisy, and unhealthful. The approval expressed by the awards given in such cases must be considered as comparative only, that alone being full which is bestowed upon systems whose radiation is indirect.

Steam is principally employed by reason of its efficacy as a medium for conveying heat to a distance from its source; and in both the direct and indirect methods the effort has been to secure the largest results from the surface heated. As saturated steam parts with its heat only at the point of condensation, a good degree of inventive genius has been exercised to provide for the water of condensation under varying conditions of surface and altitude. The American mind has been chiefly fertile in devices for these ends, and their representation at the Exhibition of 1876 reflected special credit on this class of production. A chief and constant effort has been, and will increasingly continue to be, to reduce the prime cost of apparatus, both for steam and its later congener, hot water. The regulation of

air-currents to and from the coils in the indirect method has as yet received little regard; but in this direction, especially in provision for the maintenance of the highest temperature of the air after leaving the coil, it is probable that future effort will largely be made. The wider use of these methods, made possible by a lessened original cost of apparatus and the introduction of a cheaper fuel, would materially aid, it is believed, in the solution of many sanitary and economic problems connected with warming and ventilation. The important item of radiators, both for direct and indirect employ, has received marked consideration, principally at American hands, as was manifest at the Exhibition.

The principal aim in all has been to secure the most efficient radiation, rapid escape of water, and least noise. A most ingenious combination of means to these ends, approaching as nearly as possible perhaps, under present knowledge, to a standard in these particulars, is found in the radiator manufactured by the Waltons, of New York. Future efforts, so long as the direct system remains in use, will no doubt be toward greater efficiency in the points mentioned.

Of hot-water methods of warming, it is not too much to say that they promise, even in their comparatively recent introduction and consequent crudity, to furnish the solution of the duplex problem of house-warming and ventilation. Susceptible of meeting the best hygienic conditions, and every requirement except those of churches, halls, and similar rarely-used edifices, subject to no dangers except that of frost, and most agreeable in effect as most widely available, hot-water warming will, it is believed, find rapidly-increasing favor. Great improvements in its appliances have already been reached, and found most admirable expression at the Exhibition, and the interest and inquiry now awakened in this most sanitary method will inevitably lead to the wide approval and adoption of its merits. The much smaller ratio of loss by radiation than that of steam, its greater safety, and capacity for conveyal to long distances, as well as its availability for all degrees of heat, of which steam is not susceptible, are points which unmistakably determine its supremacy. The apparatus long known as that of John Brown, of New York, and represented by the improvement of his successors, furnishes the type of its class, and has met, especially with its later accessions of improved coils, etc., the fullest approval of the Judges and of scientific men at large.

The direction which future efforts at its improvement will take must undoubtedly be towards a lessened first cost of apparatus (in which, of course, many influences are concerned), its most successful adapta-

tion to ventilation under all conditions, better distributing agents, and such provision as shall secure only indirect use. It is highly probable that the near future will witness the establishment of public heating-works in towns, by which dwellings will be supplied with hot-water circulation, a large economy of fuel and heat being effected.

RAILWAY HEATERS, GREENHOUSE HEATERS, REGISTERS.

Not the least important of the appliances for warming in the class of hot-water heaters are those which during the last twenty years, in constantly increasing variety and excellence, have been adapted to rail-cars, steamships, and other vehicles of travel. By their introduction, and later devices for safety, much of the danger from fire incident to accident on railways, etc., from the heating apparatus has been overcome. The International Exhibition, while not especially rich in representations of this class, furnished in the modifications of Howard, Bussell, and Duff, typical apparatus of American manufacture, exemplifying the progress already made in the direction of comfort, economy, and safety in travel. The chief defect of this apparatus lies in the necessity which compels it to act by direct radiation.

An application of the hot-water principle of very great merit, because long needed in the connection for which it was specially designed, is that for the warming, by the circulation of hot water and its direct radiation, the atmosphere of greenhouses, conservatories, etc. Requiring the fullest freedom from carbonic oxide and sulphur fumes, and calling for the best conservation of heat, the hot-water method of warming, it is clear, has signal aptitude for the duty, and so happily have the demands been met both by home and foreign producers that the field is well occupied. As most effectively meeting the considerations of economy, energy, convenience, thorough construction, and small first cost, the modifications of Smith & Lynch, of Boston, as exhibited at Philadelphia, fill both the sanitary and general requirements in the highest degree, and their appliances, including those for ventilation, have a wide adaptability in connection with general heating, where direct radiation may, under the circumstances, be permissible. The special wants as to heating of railway service and of in-door floriculture may be considered as well met in the provisions offered in the Exhibition.

An appliance now become inseparable from the use of furnaces, heaters, and all indirect steam and hot-water heating apparatus, and largely in use in connection with all methods of warming, is the "register," as it is called, which name for want of a better, though a

misnomer, has come to generally indicate a most convenient agent of control at the apartment apertures of all heat-ducts in dwellings. In the points of construction, adaptability to various service, finish, and degree of closure, it offers a wide and attractive variety as well as much ingenuity, and the principal manufactures, chiefly American, shown in the heating class at Philadelphia, are well worthy of mention as indicating the progress of the last half of the century, in the element of convenience, in apparatus of this kind.

As comprised within the group of so-called "heaters," a comparatively new agent in the warming of apartments demands mention here. The oil stove, standing by itself, wholly on account of its character as an adaptation for the combustion of a peculiar fuel, has interest as related to somewhat similar apparatus for burning gas, already reviewed in another class, and also as being a suggestion of the possible direction in which may turn the search for the more ready elements of combustion alluded to.

Thus far in their history their province has mainly been that of cookery, and in this connection they will be further considered; but their entry of the domain of warming has been so significant, and withal so successful, that omission of mention of their capacity in this field would be short-sighted. The possession of the chief source of the world's supply of coal-oil, almost the only fuel used in heating apparatus of this kind, has naturally given precedence to American manufactures, the Exhibition furnishing but four foreign exhibits of heating apparatus of this description, and only one for the consumption of coarse or fat oils.

STOVES, COOKING-STOVES, KITCHEN-RANGES, AND FIXED APPARATUS FOR COOKING.

We have already traced the genesis of stoves and the history of their earlier forms. The improvement in their capacities for the fulfillment of the conditions exacted of them has been from the outset steady, and of late years surprisingly rapid. When we compare the facts that, as late as 1830, almost nothing of this variety had been attempted, and that the manufacture was within the smallest limits; with the splendid figures given by American founders alone, of 2,686,000 stoves manufactured in 1876, in an infinite variety, as evidenced by the Exhibition of that year, it is evident that the Jack's beanstalk of juvenile literature only parallels such a growth. As an industry employing in the same year 28,000 men, and producing goods to the value of $47,040,000, the stove interest is one not readily over-estimated.

The early "box" and cylindrical cast-iron stoves have now but few exponents in use except in wood-burning districts, and their more widely-existing successor, the sheet-iron "air-tight," is rapidly disappearing from view. Their place, during the last twenty years in particular, has been filled in the domain of warming apparatus by the long list of representatives of rolled-iron cylinders, with cast bases, tops, etc., and fire-brick lined; while the fire-place and "Dutch oven" have in the realm of cookery almost entirely succumbed to the successive advances wrought in cook-stoves, ranges, "gas-cooks," etc. The displays of the great improvements in stoves for heating alone displayed at the Exhibition might properly be termed legion, and their varieties of device for their several ends reckoned as innumerable. For their better review they were classified with reference to certain general governing features, as base-burners, open stoves, parlor-uprights, etc.

The bent of the improvements attempted in all classes, like those indicated as essayed with hot-air furnaces,—their closest congeners,—has been towards economy of heat and fuel; consideration for sanitary requirements, as established by scientific determinations; increased convenience in use, and added attractiveness. In few particulars, perhaps, of household belonging has so great and gratifying advance been made. Inasmuch as for years, and no doubt always, there must be a very large proportion of the population who will, from considerations of economy and space, be obliged to use some form or other of stove for warming their dwellings, the recognition of sanitary principles lately obtained in most stoves, their arrangement for the largest return for the fuel consumed, and their greatly enhanced attractiveness, must be considered as of no small moment. The gains thus made will undoubtedly receive in the near future important new contributions at many hands. As proved by the exhibits made in this class, it is evident that there has ever been retained by all manufacturers of stoves in recent years a lively recollection of the cheerfulness of the old open fire, which has prompted them to endeavor to give in their products at least a glimpse of the glow within. This endeavor has from time to time expressed itself in transparent doors or lines of regulators, in the wider gleam of the "base-burner," and even more recently in the return to the open fire-place furnished by such stoves as the "Fire on the Hearth," already alluded to under *Fire-places*. Associated with this desire for the radiant effect has long been that of securing immunity for frequent renewals of fuel; indeed, some of the ancient forms of tile and porcelain stoves produced in the Middle Ages possessed large fuel reservoirs, arranged for self-feeding,

and the renewal in late years of similar agencies coupled with the illuminating device has given rise to a variety of stoves known as "Base-burners," which have come into large use, and under one "make" or another present different features for consideration. Of this class there were no less than nine exhibits at Philadelphia of American manufacture, and one (of impure type) of foreign production.

The grand objection to the "base-burner" lies in the fact that the anthracite in its reservoir, being constantly subjected to the more or less intense heat of the fire below, is under exactly those conditions most favorable to the rapid production of carbonic oxide, which, undiluted to any extent by oxygen, is hardly hindered from passing as fast as generated into the apartment. The evident evil of so direct communication between the fire-pot gases and the air of rooms has in some cases prompted the stove-founder to the use of agencies which he has hoped would prevent constant escape, but which in effect do no more than somewhat retard their passage. Sand-joints, bevel-edged covers, and the like, are proved to be only untrustworthy expedients.

It was because of this important defect in the whole line of "base-burners" that only a conditional and partial approval could be accorded them, and it was a conviction of the Judges that not until better safeguards than those at present are associated can this class of stove meet sanitary requirements. The attractiveness, convenience, and cheapness of these stoves have naturally given them a wide introduction, and if their further improvement shall include efficient means of control or removal of their dangerous qualities, and further prohibit interference between the fire and the chimney, the "base-burner," under its several titles of "Radiant Home," "Graphic," "Rising Sun," etc., will prove a valuable auxiliary to the warming of dwellings. Parlor stoves, so called, including the semi-fireplace variety mentioned under the head of *Fire-places*, and largely manufactured, have been constructed upon very various theories, and are of multiplied devices. In all, certain well-known and long-established conditions are represented, and the sole novelty of many has consisted in trifling modification of form or appliance. Nearly all, although well provided with fixtures for regulating the admission of air beneath the fire, have also the objectionable back-damper, and many have also adjustments for admitting air between the fire and the chimney. Elegance of design and finish, with more or less regard to the conservation of fuel and heat, are present in many, the old Stewart, the Magee Standard, the Grossius school ventilating, and

others being fair exponents of these among the numerous exhibits at Philadelphia. The splendid display of Fuller, Warren, & Co., of Troy, New York, was an indication of the magnitude and scope of this industry. The tendency in future efforts at advance in this class of warming apparatus seems to be towards greater recognition of sanitary requirements, economy in first cost, use, and space, and also to finer finish, greater attractiveness, and convenience. The comprehensive movements that are likely to sooner or later accomplish the heating of dwellings in towns and cities will inevitably drive out of use a large percentage of stoves now employed, and the demand thus narrowed will exact from future manufacturers the best attainable excellence in all respects.

RANGES, COOK-STOVES, OVENS, AND FIXED APPARATUS FOR COOKING.

The comparatively recent changes which have taken place in the conveniences for cooking are perhaps quite as marked as any in the accessories of the household. The facilities for the preparation of food have had greater improvements in the last century than those for warming alone; and it would be impossible in this space to follow them. Some particular mention, however, is to be found under the consideration of the class embracing *Kitchen utensils.*

In all, the requisites of health have received attention, while economy and convenience have also been thought of. Boiling, frying, and baking have become simple processes, while in the best cook-stoves and ranges the mode of baking meats has much changed.

To carry on boiling without offense from steam or odor, to fry without the latter, to bake evenly and with aeration and speed, to roast with evenness and quickly, to be able to retain fire through long periods at small cost, to obtain space without cumbrousness, and in all economy and convenience, attractiveness and ease in keeping in order, are the desiderata that cooking appliances must meet to-day to receive the approval of the housewife and the scientist. In all apparatus burning anthracite the avoidance of its dangers must determine their excellence.

The apparatus employed in cooking is ranged both by common usage and the classification of the Bureau of Awards into Portable and Fixed.

Under portable fixtures are placed all cook-stoves, ranges, gas- and oil-cooking appliances, etc., and under permanent fixtures all set ranges, ovens, and fixed apparatus. The difference established in common parlance between cook-stoves and ranges, although not

strictly technical, consists in having in the latter the apertures in its top for kettles and similar utensils "ranged" in longer parallels than in the former, and does not, as in technical definition, relate to its being fixed or "set." The cooking-stove manufacture of the last twenty years has exhibited certain general features which have undergone comparatively little change. The chief of these has been the location of the fire-pot and ash conveniences at one end, the oven, etc., occupying the rest of the stove, a varying circulation of air about the oven being attempted. In a large majority no circulation of air through the oven was undertaken or permitted, and it was not until the demonstration of Count Rumford, that this circulation, by which roasting, instead of baking, was to be secured, was a feature of prime importance, that it began to receive general recognition. It is now held essential to all good cooking apparatus.

The Magee "Standard" range, manufactured at Boston, may be taken as a type of the best application of this principle. This portable range may indeed be taken as an exponent of the highest advance in its class, and as such it received the fullest approval of both American and foreign Judges. The foreign representation of this class was very limited, and presented its chief excellence in the exhibits made of strictly portable cooking apparatus, though in "London Kitcheners," "grills," etc., both the foreign originals and their American copies received, as they merited, much praise. The marvelously smooth and artistic castings of several of the lines in this class attracted much favorable comment. A new and already important element introduced into the domain of cookery is found in the various gas, oil, and gasoline "cooks," which have been brought forward since the introduction of coal-oil. The "Florence Oil Stove," the Burnham "gas-cook," and the several forms of gasoline apparatus seem to be forerunners of more diversified and perfect appliances which will in time supersede the cook-stove and range. Economy of fuel and room, quick results, and concentrated effects are the desiderata, and indicate the probable line of improvement.

The demand for ample cooking facilities which of late years has arisen from large households, hotels, public institutions, passenger steamers, etc., has called into existence the fixed ranges of various makes, the steam-cooking apparatus, and the ship's-galleys, so liberally represented at Philadelphia.

The fixed range is still susceptible of improvement in the direction of economy and convenience, as well as of some sanitary improvement, which will, no doubt, be sought by those seeking to perfect it. The steam-cooking apparatus of every description, from the common

jacket-kettle of the farmer to the revolving and elaborate appliances of hotels and asylums, really leave little apparent room for suggestion, while the great ship's-galleys, like those of Walton Bros., of New York, have already attained so great a degree of excellence, with economy in construction and use, that the U. S. Government, which formerly built its own for its navy, has ceased manufacture, finding it cheaper and better to purchase of this make.

The advances made not only in the appliances and utensils (of which further mention will be made) but also in the methods of the preparation of food, great as they are, can only be considered as in their infancy. The indications of further changes have been noted, and it is more than probable that the present century will see the adoption of more comprehensive systems for warming, ventilating, and cooking, accomplishing greater uniformity and healthfulness of results, large economy, and better general conditions. To this end the Exhibition of 1876 will have largely contributed.

CLASS 223.—APPARATUS FOR LIGHTING: GAS-FIXTURES, LAMPS, ETC. VENTILATING APPARATUS. WATER-SUPPLY APPARATUS: PIPES, FAUCETS, FILTERS, HOT-WATER BOILERS, WATER-BACKS, AND PLUMBERS' GOODS GENERALLY. DRAINAGE: PIPES, TRAPS, AND SEWER-CONNECTIONS AND APPARATUS. ABATTOIRS, AND ACCESSORIES FOR UTILIZATION OF REFUSE. DISINFECTANTS IN THE SANITARY APPLICATION. ODORLESS EXCAVATING APPARATUS IN THEIR SANITARY RELATIONS.

APPARATUS FOR LIGHTING: GAS-FIXTURES, LAMPS, ETC.

Our present purposes do not render it either necessary or desirable to consider in detail the several theories of the genesis of light, or to any considerable extent its especial properties. With it, as an existing entity long the prime factor in the field of illumination, and its numerous adaptations there, we have chiefly to deal. Moreover, to sketch faithfully the rise and progress of the agencies whereby man has sought to make darkness light about him would require far greater space than the limits of this report afford, and, interesting as it would prove, is not, in detail, essential to a proper review of the representation made at Philadelphia of the state of the art.

The efforts of the student of illumination, whether philosopher or mechanic, have been—

a. To secure abundant and cheap materials of the greatest light-producing capacity, capable of readiest ignition.

b. To develop forms of apparatus for their use which should most efficiently produce illuminating effects, combined with economy, safety, convenience, and attractiveness.

The search for illuminating materials was of course the original necessity, and first produced the candle, which from time immemorial has been the simplest and crudest artificial illuminator. This and the oil- or grease-lamp, which early came into use, seem long to have been the sole lighting agents.

For centuries the effort seems to have been rather toward multiplying and elaborating candelabra and lamps than toward gain in the light itself. Certainly, neither results nor records remain to testify of such improvements in illumination beyond those that provide for multiplied lights. As early as B.C. 221, however, Hero of Alexandria intimates that some efforts at mechanical aids to the quantity and quality of light had been attempted, all relating to a better supply of oil to the wicks of the lamps, which were at that day chiefly relied upon for light. Pliny informs us that vegetable oil was principally in use, sometimes with liquid bitumen. The lamps were mainly terra-cotta and metal, and hung by chains to bronze candelabra, which Tarentum and Ægina were famed for making in great elegance. The lamps were principally flat, oblong, or round vessels, with a small handle at one end, and a little nose or projection at the other, with a hole forming a nozzle, and a central opening, into which the oil was poured. In all the older lamps crust from the oil formed constantly upon the wick, and required the frequent use of a picker. Till within the century just closed the means of illumination underwent no marked change, candles and the simple oil-lamp and wick furnishing the only available lights. Leland says with truth that "none of these lamps gave a good light, and the majority of the poorest persons of the younger generation, especially in our cities, have literally no idea of the limited artificial illumination, even of the rich, before the days of gas, camphene, lard-oil, and hydrocarbons."

The state of high illumination, as represented at the Exhibition of 1876, has been reached within the last century, and American genius has been in some, if not all, of its departments the chief contributor to the success achieved, although in the early scientific efforts at the improvement of light, on which the later advances have been based, France and Great Britain bore a leading part; though our own Benjamin Thompson, Count Rumford, so actively useful in the whole range of science, contributed to this one of its chief elements, the splendid aid of the multiple wick.

M. Aimé Argand, as late as 1784, discovered the secret of ampli-

fying light in furnishing by means of a circular form a double current of air to the burning wick; increasing and steadying the flame, which he further aided by means of a glass chimney. Hundreds of the myriad lighting devices since invented are modifications and re-adaptations of these two features.

Keir, Quinquet, Rumford, Carcel, Arago, Teulêre, Fresnel, and a hundred others in France, Great Britain, and America, rapidly followed with inventions of greater or less importance, Diacon furnishing the improved lamp for years most popular in America, and celebrated in Wood's singular novel describing the adventures of a lady in search of a really good lamp.

The transition from the candle and vegetable oils was not effected till a late day; lard- and whale-oils and ultimately spirits, as alcohol and camphene, came into wide use, and from these to hydrogen gas and the mineral oils has been a comparatively rapid and recent step, and a most important one. The discovery of the large deposits of petroleum in America has been largely responsible for the rapid advance made in the perfection of common lighting apparatus, while the introduction of hydrogen gas as a brilliant illuminator has entirely changed the character of the means employed. The generation of lights of intense brilliancy by chemical and electrical agencies marks the furthest advance in illumination yet attained, and completes the marvelous contrast in this field between the opening and the close of the century.

Except for special uses, where economy, taste, or peculiar conditions call for its service, the candle has naturally disappeared, and where retained, has so changed its character in its new forms of spermaceti, stearine, paraffine, wax, etc., as to be quite unrecognizable as the ancient "dip." The candles now in use—and the Exhibition was rich in them from various nationalities—are almost exclusively "moulded," wax being the chief exception. Their greater hardness and uniformity of material, as well as their improvement in wicks, renders them far preferable for all ecclesiastical and portable uses to former ones, while their character as standards of photometric power has undergone obvious change. The unit of artificial light has long been established as the light of a candle, but the rapid changes and improvements of these standards has necessitated a determination of what the candle itself, to be such a test-unit, should be. The test candle of photometry is now a candle so burned as to consume 120 grains per hour, and many of the improved forms of chandlery fill these requirements.

The common single-wick oil-lamp, burning the heavy vegetable or

animal oils, has passed, except in the most remote sections, entirely into disuse, and even there the rapid advance of coal-oil is displacing it. Only a very few exhibits, and those from abroad or for specific uses (as in arctic regions), were found in the Exhibition for consuming grease or heavy vegetable and animal oils. This form of lamp, from the earliest days to within a few years almost the only, as it was also the poorest, of lighting agencies, may be considered as having served its day and become obsolete.

There were shown by foreign and American manufacturers more than ninety exhibits of lighting apparatus, besides candles, at Philadelphia, designed for dwelling, public edifice, street, railway, ship, light-house, hand, and special use, by far the larger part of course being intended for the needs of the household. The range of this apparatus comprised chiefly appliances for the consumption of mineral oils and hydrogen gas, with liberal exhibits of candelabra, burners, chimneys, shades, etc.

Manufacturers of lamps seemed to aim to secure that supply of air to the wick, and direction of it upon the combustion points, which should produce most light. Indeed, this feature must be held as essential to a good burner, whether for oil or gas. Safety to life and health, and fidelity of construction and correctness of design in gas-fixtures and lamps, were made matters of careful inspection. Finish and convenience were incidental points for approval. It is probable that never before were so varied and elegant collections of gas-fixtures or improved lamps and accessories brought together, and the task of rightly examining and approving was neither brief nor easy. The older forms and styles of finish in gas-fixtures, except among the foreign exhibits, were singularly absent, and new devices and patterns constituted much the larger part of the splendid array, which was chiefly of American workmanship, although most creditable exhibits in certain lines were made by foreign houses, notably the English, French, German, and Swedish.

Associated with the large display of gas-fixtures were the articles of ecclesiastical ware, which are their congeners, and, as they formed part of the representation, they were, by instruction of the Bureau of Awards, at a late hour of the Exhibition included in the review.

Of gas-fixtures and accessories there were some half-dozen prominent and most comprehensive exhibits, those of Mitchell, Vance, & Co., the Archer Pancoast Manufacturing Company, and Cox, of New York, Cornelius & Sons, and Baker, Arnold, & Co., of Philadelphia, and Hart, of London; while in crystal fixtures the displays of Jas. Green & Nephew, of London, and of the Mount Washington Glass

Company, specially excelled. It was found that not only a somewhat exact knowledge of the laws governing the diffusion and absorption of light, but also much of technical and mechanical familiarity were demanded for a proper appreciation and discrimination in the extensive range presented by these large exhibits in iron, spelter, brass, bronze, steel, and crystal, while unique specialties in each required definite and critical examination and comparison with the general standard set up in the mind of the Judge. The burners, chimneys, shades, regulators, slide-lights, etc., required close examination, not always resulting in satisfactory determinations. The gas-fixture itself was of necessity separate in consideration from its burner, and must be estimated by its material, construction, convenience, finish, and general effect, while its burners and shades were to be examined with reference to their supply of oxygen to the flame, delivery of light, and condition for service, these being, moreover, affected by the conditions under which the gas burned was manufactured and delivered to them. It was impossible also to avoid some recognition of the æsthetic effect produced by single or grouped examples. Of lamps in their almost limitless variety and purpose, the requirements though in the main similar were often special, and embraced considerations of photogenic capacity, safety, convenience, economy, cost, and fitness for their purposes.

Under all the requirements exacted in gas-fixtures the whole exhibit of Mitchell, Vance, & Co., of New York, most fully met the approval of the Judges. In the specialties of colored ecclesiastical ware and slide-lights, that of the Archer Pancoast Manufacturing Company was the best; in brass goods of the later designs and finish the productions of Baker, Arnold, & Co., of Philadelphia, were superior; while the crystal fixtures of Jas. Green & Nephew, of London, and the Mount Washington Glass-Works, of Massachusetts, stood unequaled. In lamps, the special requisites of each class render separate standards of comparison inevitable, and the determining of excellence was both tedious and difficult. The great majority of exhibits, as would naturally be expected, were of lamps for household uses, designed principally for the burning of coal-oils. The determinations of science as to photogenic force and the liability to accident by explosion, demonstrated in common use, have furnished the chief indications of the proper direction for inquiry as to relative excellence, while points of convenience and economy enter incidentally into the conclusion. As more economical of oil, the flat wick in lamps, producing a good although not the highest degree of illumination, is most commonly employed, and both the amount of

light furnished and the immunity from danger are found to be largely dependent upon its adjustment and surroundings. These features belonging peculiarly to the burner, its character would seem alone to establish merit or demerit under the heads named, but there resides in other parts of the lamp such influence upon these, that it is as a whole that the lamp is most properly examined. The height and shape of the lamp, the material of which it is constructed, the perfection, adjustment, and security of its fittings, the size, shape, length, and thickness of its chimney, the position, material, and opalescence of its shade, and its absorbent power, the nature of its reflector,—if it has one,—the conveniences for cleaning, filling, lighting, and regulating it, all are points which immediately concern both its power for luminous effect and its safety and facility of use, and all require consideration in determining its merit. Many of the common lamps exhibited were entitled to approbation in most particulars, those receiving fullest approval whose shape and form of neck retained their oil so near the surface as to leave little room for gas accumulation above, and were so constructed for the free supply of oxygen and its minute division as to maintain freest combustion with coolest condition of the metal parts of the burner. It has been indisputably established by the experiments of Dr. Baker, of the State Board of Health of Michigan, that the dangers of explosion reside in the generation of gases above the oil in the lamp, which may remain at a comparatively low point, say not above 85°, and that this generation is due chiefly to the influence of the heated metal parts of the burner. This difficulty of the overheating of parts was met, in the use of heavy oils, by Carcel, by pumping oil up to the wick and causing it to overflow and cool the burner. This is, of course, impossible with the hydrocarbonaceous oils as at present burned, and recourse must be had to other agencies for its prevention. What is known as the "Sun" burner, and that known as the "Drummond" burner of Lovell, seem best to attain the ends sought—the former by its subdivision of air and distance from the oil, and the latter by its arrangements of air and absence of chimney. The lighting apparatus known as the German Student lamp, of which there were several styles on exhibition, affords, when properly constructed, one of the best agents for shedding light for those occupations of the household which are confined to a given spot, as sewing, reading, etc. Being arranged for the amplest supply (short of mechanical forces) of air by double current to the wick, having its supply of oil furnished under air-pressure and its circular wick susceptible of exact adjustment, the joint inventions of Kluman, of Prussia, and Hinrichs, of New York, offer

a lamp that both in regard to its illumination power scientifically considered, and its provisions of safety, convenience, and elegance, has thus far no superior. The somewhat similar device of Perkins & House presents certain variations of more or less merit. To Mr. C. F. A. Hinrichs, of New York, whose exhibition was a comprehensive one in this style, large credit is due for successive improvements of great value. The adaptation to a lamp for table use of the principles and their appliances originally arranged for light-house service by Captain H. H. Doty, an American engineer, has furnished a light of superior power and brilliancy, which, though as yet but little known, appeared to the Judges likely to meet a popular approval as generous as that already accredited it in scientific light-house circles. The Berford "sunlight" for house use, consisting of a gas flame over a transparent bowl filled with water, received the approbation of the Judges, as did also the somewhat similar hydro-dioptric light of General Meigs, U. S. Army, which substitutes a globe filled with water for the bowl, and makes the flame movable at will about it, furnishing a soft but concentrated light at a desired point. The subject of lighting the streets of towns and cities has long received much attention, but only recently has received such elucidation as combined efficient light, economy, convenience, and attractiveness. The Exhibition, while not rich in the number of aids of the kind, offered a fair representation of the older and the later methods and appliances. The latter included the exhibit of J. W. Bartlett, of New York, of gas post-lanterns, with patent torch and key for convenience in lighting and extinguishing, and the apparatus of the Globe Gas-Light Company, for the use and volatilization of hydrocarbonaceous oils, both of which excel in their respective types. The former has its chief excellence in the shape, construction, and material of its lantern, which being almost wholly of glass and permitting the freest admission and escape of oxygen, permits a better and steadier flame than older devices and at the same time a much enhanced diffusion of the light. The Globe apparatus consists of a reservoir of hydrocarbonaceous oil fixed upon the post-lantern at a safe distance from its burner, to which its contents are conveyed by a pipe, being volatilized at the burner, the resulting gas feeding the flame and thus contributing to the street-lighting of places without regular gas-supply, an agent which, when properly cared for, provides at a less cost than that of gas an equivalent light.

The needs of railway and steamship service, both for outside and inside use, have long been recognized, but—the latter especially—very inadequately met. The Exhibition of 1876, however, produced cer-

tain exhibits in both branches of employ which received the highest commendation of the Judges. Lanterns of both the larger and the more portable varieties had no lack of representatives for railroad, ship, and mine, signal and common use. The cases of Walton Brothers and Miller & Eastmead, of New York, furnished all patterns in unrivaled excellence of design and finish. For car and cabin use, the special adjustments of Hinrichs, on "student-lamp" principles, of Creamer & Howard, were of greater or less merit; but none of them at all compared, under photometric test, for illuminating power with the car and ship lamps of the Hitchcock Lamp Company, of Watertown, New York, a mechanical apparatus which supplies its heavy oil to the wick by pump, and its air by fan, and is a marvel of mechanical aid to illuminating effect.

In light-house service the splendid accomplishment of Doty, providing for the use of mineral oils with their large economy and reliable results in this most important branch of illumination, was the distinctive exhibit as such (the results of Fresnel and others being on non-competitive exhibition in the Government Department). This apparatus, which has received the approbation and adoption of various foreign scientists and governments, reflects honor alike upon its inventor and America, as the first successful invention obtaining the highest order of results in the burning of mineral oils in light-houses.

The calcium light had but one representative, and to this as the latest exponent of scientific advance the highest award was accorded. In burners, chimneys, shades, wicks, and reflectors the exhibitions were neither inconsiderable nor unimportant. The automatic burner of Rollins, for regulating the supply of gas, received the approval of the Group with others, as did also that of Lovell, the "Sun burner" and others, for oil; Argand's, Carcel's, multiple and single "bat's wing," and straight burners, presented points of excellence not enumerable here. In chimneys no small thought and experiment, at home and abroad, was manifest, thousands of forms having been attempted to determine and secure the best results in directing the flow of air about the wick. In shades, both with reference to their powers of absorption and transmission of light and external beauty, a wide range was presented. The plain, opal, and decorated ware of the Mount Washington Glass-Works, and of Smith Brothers, of New Bedford, Massachusetts, and the wonderful production in this class of Minton and others of London, and of the French exhibitors, were optically and artistically entitled to the highest commendation. The special contributions of wicks were very few, but quite a variety in connection with different lamps was exhibited, including novelties of more or less

merit in concentric and flat wicks, the "Centennial wick" of Lovell, of New York, being in its class an improvement.

Of reflectors, both of silvered glass and metal, there were several patterns of much merit. That of August Wilhelm involved in a high degree the best scientific determinations as to form, arrangement of surfaces, and construction, and that of the American Reflector Company in shape and workmanship met approval.

The exhibit of the Bradley & Hubbard Manufacturing Company, of New York, presented novelties in lamp construction and accessories of special excellence and wide variety, in all of which superior workmanship and fidelity of construction were evident. In iron and spelter permanent fixtures for gas and oil their exhibit stood unexcelled.

Although neither in gas nor oil metal-fixtures did the exhibits of foreign contributors attain so high a degree of excellence as those of American exhibitors—as might, from obvious reasons, be expected—Great Britain must be given the palm in crystal-work, while in brass finish it was well contested. In the finer manipulation of glass and porcelain lamps and shades of all kinds, and especially in their decoration, Great Britain, France, Germany, and Sweden notably excelled.

The direction of efforts at future improvements in lighting apparatus will unquestionably be, in gas-fixtures, toward better provisions for the distribution of oxygen to the flame, resulting in increased brilliancy and steadiness; greater security from the accidental escape of gas (which will doubtless be better purified), and a more efficient provision for automatic control, by the burner, of the pressure in the pipes. Better media for conveying gas from permanent fixtures to others for temporary use are needed, and will in time be furnished. Improved agents of refraction and reflection are probable, and beyond doubt efficient carburetting of gas, and its production from new and cheaper sources than present ones, will mark the future. In the consumption of mineral oils, a broad field for advance lies open, and will encourage successful effort. The improved distribution of oxygen to the flame, higher illumination, and such construction and combination of parts as will effect greater safety, are to be looked for.

VENTILATION.

So many theories and plans, and so much complex apparatus have been brought forward in ventilation, most of which have in application resulted unfavorably, that the public has despaired of the existence of a science which might be appealed to with certainty in given cases.

The laws of sound ventilation are,—

a. That each adult must be supplied with about 3000 cubic feet of fresh air per hour.

b. That the air he receives shall be distributed through so large a cubic space as not to require at the outside more than five or six renewals per hour to reach the amount named, inadmissible drafts being thus avoided.

c. Air to be distributed with the best results must enter a room warmed at the bottom, and find its chief exit by apertures near the floor.

There were but half a score of special designs or apparatus for ventilation displayed at the Exhibition, two being diagrams or plans of systems proposed. The first of these, by Mr. Lewis W. Leeds, of New York, well known as a scientific engineer of ventilation, was a comprehensive and able representation of conditions of ventilation, well provided for on recognized principles, and received the highest approval of the Judges. The other was simply a plan of the ventilation system of a public institute. The design and apparatus of Mr. George R. Barker, of Philadelphia, whereby warm air from a furnace enters through the upper half of a wall-register, and its current aids the escape of foul air, by an under duct leading from the lower half of the same register, was approved by the Judges as well calculated for its purpose. The Wagner ventilator, designed for attachment to the glass of a window-pane, a perforation being made for the flow of air through the pane, was found to be of some efficacy as an auxiliary of ventilation, as were also the devices for window-sash ventilation of the Protective Ventilating Company, J. C. Bates, and others.

WATER-SUPPLY APPARATUS: PIPES, FAUCETS, FILTERS, HOT-WATER BOILERS, WATER-BACKS, AND PLUMBERS' GOODS GENERALLY.

The house portion of the appurtenances of water-supply to communities was assigned to this group, and those appliances which furnish, retain, and conduct water for domestic use within the dwelling may be considered here.

The extended and varied list of devices presented in this class of exhibits is the result of intelligent efforts, on both sides the Atlantic, to furnish the accessories of water-supply in economical, convenient, safe, durable, and automatic form. Convenience and durability coupled with safety in use have been the chief points of concern, and the rapid advance of the last ten years especially was observed by the Judges of the group.

The pipe system without the house being under the more especial consideration of another group, the service-pipes alone came under review, and of these the exhibition, though not large, was creditable both in iron and the softer metals. The lead-pipe of Tatham Bros. was of very superior character, and in its class was a fair representative of what lead-pipe should be. An Australian exhibit of block-tin and tin-lined pipe was also noticeable for its excellence. The enameled wrought-iron service-pipe of the National Tube Works, of Boston, in its unexcelled appearance and apparent special fitness for its use, deserves popularity if its joints shall be found to be satisfactory. It received mention in another group, but, as being intended also for house use, comes within the proper scope of this report, and received commendation.

The faucets shown, as most important water accessories, were both numerous and of high character. There were few foreign exhibits, and these were by no means up to the standard assumed by the Judges. The Fuller patent cock received approval, and, although several others approached its excellences, was held to most satisfactorily combine the requisites demanded. The Meyer faucet and anti-freezing hydrant were in their kind subjects of award, as possessing the prescribed conditions for security and durability. The Blessing patent bath-cock, an ingenious adaptation for bath use, also secured award. The splendid exhibit of Cooper, Jones, & Cadbury, of Philadelphia, was evidence of the wide range of device and excellence of finish attainable, while that of Henry C. Meyer & Co., of New York, showed ingenuity and fine workmanship. Among the novelties in faucets, special devices of wood and crystal were exhibited well adapted to definite purposes. Present hygienic and economic considerations for conveniences for water-supply and drainage demand that form of apparatus which most certainly prevents the waste of fresh water, and cuts off communication with sewers after foul water has been discharged into them. As the latter, to be most effectual, must be automatic, it necessitates the same characteristic in the former, and hence the automatic faucet is already receiving approval and adoption, which, with the spread of information on these points, must be largely increased. One of the chief concerns of a city is the waste of its water-supply, and the self-closing faucet, it will soon be understood, is a most valuable aid to its prevention. The item of filters in connection with water-service, though but few were exhibited at Philadelphia, was, in the few varieties shown, worthy of consideration, and, it is believed, will lead to larger study of their uses with beneficent results. The filtering media in all included charcoal or spongio-kaolin,

and on trial all were found to accomplish satisfactory results. The rapidly-increasing contaminations of our domestic water-supply are fast rendering it necessary that all available intermediate agents for freeing it from suspended matters shall be brought into use, and as being steps in the right direction, although all in themselves of small capacity, except those of Tellier, of France, and Cheavin, of England, they received award. The latter are of large capacity and effectiveness. The multiple filter of Tellier is an elaborate and scientifically-constructed apparatus, which is highly efficient in its work, but will undoubtedly be simplified in future improvement.

Several hot-water boilers, as adapted to the hot-water supply of dwellings, were shown in the Exhibition, all but one being American. Those of Steeger, of New York, and Blessing, of Philadelphia, received awards. These agents for the heating of water and its circulation through its pipe-systems in domestic use, whether of iron, copper, or other metal, have of late years come into greatly extended use, and are objects deserving special consideration as having power to affect considerably the "health, comfort, and convenience" of our homes. As their strength should be proportioned to the pressure, it is important that in use they shall be equal to the service to which they are devoted, and the most perfect fidelity in their manufacture becomes imperative. Their effectiveness depending also upon their flue-surface, it is probable that improvements in this particular will be made. As attached to the fire-pots of kitchen-ranges and as at present constructed, their use is confined to the simple heating of the direct circulation to and from the bath-tubs, faucets, etc., where hot water is used. Future improvements will perhaps so amplify their capacity for heating that with possibly slight increase in the size of boilers they may also be utilized in the warming of small spaces, as conservatories, or bath-rooms, otherwise unheated.

Bath-tubs form an important part of the apparatus connected with water-supply, and those shown at the Exhibition were especially well deserving. The contributions in this class were not numerous, and were chiefly of home production, though four foreign exhibits were included, the latter, however, being inferior both in workmanship and finish to the American. The nickel-plated copper tub of Peter Carrigan, of Philadelphia, was, in its character of construction and finish, a standard, while those of Blessing, of Philadelphia, having the combination-cock alluded to, W. S. Carr and Steeger, of New York, each received the commendation of the Judges.

The constant effort of inventors and manufacturers of sanitary ware has been to overcome certain defects and institute certain improve-

ments in household lavatories, basins, etc. To secure the rapid discharge of foul water from bowls, to prevent the clogging of exit pipes, to provide against the ingress of sewer-gases, and to economize both water and soap has been their study. In the "tip-up" basin of Geo. Jennings, of London, the desired results have been largely accomplished, and in many particulars it may serve as a standard. The bowl being hung upon lateral pivots, and suspended by these in an outer or jacket-bowl, it may be "tipped" at pleasure, and its contents at once and completely discharged into the bottom of the outer bowl, whence they flow off through a well-protected opening in the bottom, by the trapped pipe, the bowl being held to a proper level by a rubber-guarded "preventor," against which it strikes. The handle by which it is tipped being hollow forms its "overflow." The latest, and in some particulars best, invention presented in this class was the Waring "Safety" basin, manufactured by A. G. Myers, of New York. It seeks to render absolutely impossible the ingress of sewer-gas either by the bottom discharge-pipe of the bowl or by its "waste" or "overflow." Provided with self-closing faucets, no overrunning of the bowl could easily take place, but if these are absent the "overflow" is efficient, and both this and the discharge-pipe are closed by fixtures that are open only when held open, and that are only closed the tighter by any pressure of sewer-gas beneath, so that no opportunity ever occurs for the escape of gas into the apartment. Its adjustments are simple, efficient, and ingenious.

DRAINAGE: PIPES, TRAPS, SEWER CONNECTIONS AND APPARATUS.

From a remote period the conveyal of excreta and other refuse to remote places of deposit by water-carriage through open or closed drains or sewers has been practiced, and the surcharge of water in soil desired for agricultural purposes has also been withdrawn by drainage-pipes. Whatever the later deductions of medical and economic science may indicate with regard to the undesirability of such disposal of excreta, existing widely as these agencies do, in the absence of better means they must long continue in use. In agriculture there can be no doubt of the value of drainage.

A considerable number of exhibits of drain-pipe, traps, etc., were presented by both foreign and American producers. Among British exhibitors, the Doulton-of-Lambeth vitrified pipe and that of Scotch makers were without rivals among foreign exhibitors. Among American producers, the wares of the Moorehead Clay-Works, of Phila-

delphia, and of N. U. Walker, of Ohio, were approved. The effort has been to produce pipe that would resist superincumbent pressure and effects of frost, remain impervious to the action of sewage, or gases, or solvents, offer least friction and obstruction, permit closest coaptation, and be freest from defective structure. The degree of artistic finish and mechanical perfection to which they have been brought, as demonstrated at Philadelphia, is surprising, and the special shapes and adaptations for peculiar use seem to provide for any contingency. The vitrified pipes of the makers named were subjected to the severest tests of weight, acid solvents, and heat to determine their individual relative approach to the standard set up. Certain inherent characteristics in the material of the old Scotch pipe afforded matter for curious inquiry, and the glazing, whether "slip," salt, or lead, was subject of much careful testing. The heat test was not deemed of much practical significance except in relations to steam or fire proximity in use, but was the crucial one for certain makes of pipes, which melted entirely under its intense application. The "slip" glazing was held to best fulfill the desired ends. Vitrified traps of various devices, provision for ventilation being embraced in some and neglected in others, were liberally displayed both by home and foreign exhibitors. Certain German manufacturers, although their exhibits were small, received approbation for their contributions to this class. Invert blocks and sectional parts were abundantly represented. The importance of well-constructed joints, and of all aids to the control of sewer-gases, seemed to be carefully studied.

Disinfectors for the distribution of neutralizing agents to sewage are properly considered in connection with drainage, and though but two specimens of this type of apparatus were exhibited, both, as performing good and efficient service, deserve mention. The "disinfector" of Jennings, of London, acting on principles well understood in physics, is so operated by the discharge apparatus of the water-closet as to deliver the disinfectant into the bowl of the closet as often as desired. Its action is reasonably certain and efficient. The "disinfectors" of W. F. Wheeler, of Philadelphia, are contrivances whereby the flow of the water to urinals, water-closets, and sinks is made to act as the solvent of disinfecting agents in saponaceous form, contained in ingeniously constructed and exceedingly compact, simple, and elegant receptacles through which the water passes. Their simplicity, and the really efficacious way in which, under the observation of the Judges as applied to the Exhibition Buildings, they seemed to act, elicited high commendation. Of apparatus in connection with sewers adapted for their cleansing, but one exhibit

was made, that of Field's flush tank, introduced by Mr. A. G. Myers, of New York. The design of this simple but effective instrument is to suddenly discharge by pneumatic aid the contents of a larger or smaller tank in which the waste waters of the household shall have gradually accumulated into the sewer, thus flushing out the sediment lodged therein. The design is a good one.

In water-closets the improvements sought for have been to render them effectual as ready, inoffensive, safe, and inexpensive house depositaries for excreta, and to receive approval they should be such in the fullest degree. The advance that has marked their history, brief as it is, is not less surprising than that which attaches to most of the inventions in this department. Originally cumbrous, poorly constructed, uncleanly, extravagant in first cost and in the use of water, easily out of repair, and radically unsafe, device has quickly followed device for the amelioration of all these conditions, until the makers of Great Britain and America vie with one another for supremacy, finding the race a close one. The palm for superiority in the principal features resides, however, with the foreign maker, the most perfect closet now in existence being an improvement of Mr. Myers, of New York, upon the main features of the closet of Mr. Jennings, of London. The apparently trifling but important improvement of Mr. Myers upon Jennings, both of whom received awards, consists in the substitution in the closet of a beveled, solid plug with air-tight seat, for the hollow one formerly used, thus securing more perfect exclusion of gas, while both provide means for ample ventilation. A prominent feature of advantage in the closets alluded to is the location of the trap directly beneath the bowl, which brings it above the floor,—a point of much convenience where floor-timbers are shallow and it is undesirable to raise the seat. Other closets taking rank close after these received due appreciation.

The earth-closet, though distinctly not a sewer connection, from the fact that it deals with excreta and finds no fitter association, may be briefly reviewed here. Its purpose was to find a means whereby human excreta might be quickly and quietly deprived of power for offense or harm and retained in fit condition for agricultural use. It was intended as a substitute for water-carriage, and indeed for all other plans of conservancy, and, in a limited degree, it accomplishes the end. Experience has taught that its power for usefulness is restricted by the difficulties involved in procuring, preparing, and removing the dry earth required in its use, and to some extent by those which attend, mechanically and chemically, the application of the earth to the dejecta. The inherent defects of the earth-closet

reside in the seeming impossibility of obtaining just such perfection of mechanism as will completely do the required work automatically. The devices of the kind are numerous, though but one was exhibited at Philadelphia. To be at the best, an earth-closet should have its mechanics simple and automatic, and all its parts closely fitted, its hopper long-lipped in front, and its tank rise close to its seat. It should never operate by weights, which act badly and interfere with the space beneath. Its reservoir should be arranged for the easy reception of ashes or earth, and so constructed as to facilitate the ready delivery to the distributor. The Wakefield closet examined by the Judges, while not embracing all these features, was still a serviceable closet of considerable merit, and as such received an award. It is confidently predicted that no one of the appliances of a sanitary character will undergo greater improvements in the immediate future, nor play a more important part in the sanitary problems to be solved.

DISINFECTANTS IN THEIR SANITARY APPLICATION.

There were but few entries in this class at Philadelphia, about equally divided between foreign and American producers. The disinfecting apparatus of Geo. Jennings, of London, had in use a disinfectant which was reasonably efficacious; principally permanganate of potash. It was uniform in action and satisfactory. The agent employed in the disinfectant of W. F. Wheeler, alluded to in drainage connections, was a composite of carbolic acid and borax, and in its extended use about the Exhibition proved very efficient. The English exhibit of Dillwyn Smith of disinfecting apparatus and agents for disinfecting the cabins and holds of vessels was of unique and apparently efficient character. It was the only apparatus of the kind having no connection with sewer systems.

ODORLESS EXCAVATING APPARATUS.

Several styles of appliances for the inoffensive removal of human excreta, etc., from vaults and cesspools are thus called, and are the practical result of experience in all lands of this necessary but unpleasant process. The history of efforts at the production of apparatus to accomplish this work is somewhat limited, but enough is known to enable us to trace with considerable exactness the march of the improvements that have appeared from time to time on both sides of the Atlantic, and which have led up to the more highly-perfected

appliances which the Exhibition made known. In all some form or other of pumping apparatus, or application of the pneumatic principles of physics, has, by peculiar mechanism, been enlisted, and with greater or less efficiency. To be of the best an apparatus must be simple, light, cheap, and compact, convenient in handling, secure in its construction and use against the dissemination of foul odors, rapid in its operation, durable, inexpensively operated, requiring few men and horses, noiseless, and so composed as to require little manipulation, and to permit of any of its parts being readily cleaned or replaced. It must provide for the destruction or harmless occlusion of offensive gases, and easy removal of the excreta.

There were four exhibits of this class, one of which, however, being the property of one of the Judges of this group, could not enter into competition. Of the remainder, three operated by pumping the material from vaults and cesspools directly through the pumps, which were provided with peculiar valves. The fourth operated by means of an air-pump, which created a vacuum in a receiver connected with the vault by a hose, the atmospheric pressure causing the vault contents to fill the vacuum. All were capable of doing good work, and received recognition accordingly. This form of apparatus is yet in an undeveloped state, and time will add largely to both its variety and effectiveness.

CLASS 224.—Kitchen and Pantry Utensils, Tin-Ware, and Cooking Apparatus.

In this large and multifarious class, which held much that was best and more that was poorest in the Exhibition, little attempt at subdivision or analysis can be made, much less minute review of the features and merits of particular exhibits. Under the general head of utensils of convenience, in connection with kitchen and table service, articles were ranged with little further relation to one another. The tea-trays manufactured by the Newark Tray Company evincing workmanship and quality of lacquer that were the envy of other manufacturers, home and foreign; japanned ware in great variety and beauty, coal vases, etc., from both Rohman and Scheider; bread-knives of various makes; the nonpareil flasks of Wattis, an ambitious and wonderful dish-washer, Culver's ironing-machine, Mrs. Potts's and Mrs. Ball's sad-irons, each challenged admiration in their individual fields of service, and received award. In the domain of tin-ware, the fantastic and marvelous shapes of Musgrove & Son, the splendid range of domestic goods of Ketchum & Co.; above all, for artistic concep-

tion and innumerable uses, the white lustral wire-ware of Woods, Sherwood, & Co., an industry which has already wrought an overturn of national importance in its own line, and the graceful "forms" for frozen viands, jellies, etc., from Norman, of Germany, all won upon the housewife and the Judge. In the line of utensils specially designed for cookery, the porcelain-lined ware of Stuart, Peterson, & Co., of Philadelphia; the beautiful "granite-ware" of St. Louis, which stood the most crucial tests of fire, cold, and boiling acids; the polished copper-ware for ships and kitchen use, and the Ettzenberger coffee-urn, were each successful exponents of their several types.

The refrigerant apparatus, the water-coolers of half a dozen makes, the capital ice-crusher of Law, the cream-still of McKelvey, and the refrigerators of Lesley and others were excellent. Our transatlantic visitors were also successful contributors to this department of domestic purveying, and the kitchen utensils, bright, rich, and heavy, antique and modern, of Francisco de Paula Isaura, of Barcelona; of Kerls, of Erben, in Austria; of the Companie de San Juan Alcaraz, and of Belczkericz, of Warsaw, all testified their interest in this grand bazar of the nations, and contributed not a little to the instruction and interest concentered there.

REPORTS ON AWARDS.

GROUP XIV.

1. Charles Burnham & Co., Philadelphia, Pa., U. S.

GAS COOKING STOVES, REFLECTING PARLOR GAS STOVES, AND GAS HEATING STOVES.

Report.—Commended for the following reasons:

1. Substantial construction and neatness of the cooking stove, and the facility with which its furniture can be adjusted.

2. The ease with which the apparatus may be cleaned and repaired.

3. Its perfect combustion quality.

4. Its admirable adaptation to domestic uses, and its safety.

The reflector parlor stove is recommended on account of its cheerfulness, being an illuminated open fire-place, its convenience for location, for heating the feet, etc.

2. Walton Brothers, New York, N. Y., U. S.

NOISELESS OPEN-BASE STEAM RADIATOR, AND SHIP'S GALLEY.

Report.—"Noiseless Open-Base Steam Radiator." Commended for the following reasons:

1. Its open base, permitting the most equable supply and radiation of air, makes certain a nearly perfect circulation.

2. Its noiseless operation (as established by test) is a feature of merit. The escape of the water of condensation being provided for, the jarring and snapping so frequently heard in steam radiators is here absent, the tubes being left quite or nearly dry.

3. The circulation effectually prevents the accumulation of air in the tubes.

4. The water-trap secures the full utilization of all the steam supplied, and hence it has increased value in an economic point of view.

Ship's Galley. This "galley" is unique in its advantages and in its arrangements for the economic use of fuel with large results.

3. Swett, Quimby, & Perry, Troy, N. Y., U. S.

"GRAPHIC" PARLOR STOVE.

Report.—Commended for the following reasons:

1. Its reversible flues are so constructed as to give the largest amount of space required for purposes of perfect combustion, both in direct and return draft, thus insuring a free and easy operation, however defective the chimney.

2. The construction of the fire-pot, so shaped that the ashes and slag will not be held against its side to prevent the radiation of heat through it; it is easily removed.

3. The cleaning grate, the feeder or magazine, mica doors, illuminated vase, hot-water tank, adjustable clinkerless grate, patent self-lifting feed cover and ash pan, are among the novel and useful features of this excellent stove.

4. Magee Furnace Co., Boston, Mass., U. S.

STOVES, RANGES, AND FURNACES.

Report.—Commended for the excellence of the several exhibits enumerated in the directions and particulars hereinafter specified and described.

In Stoves: The "Magee Standard Parlor" holds superiority of design, character of workmanship, finish, and novelty and effectiveness in plan of construction, with economy in use.

The "Magee Standard Base Burner" holds eminence from its unique design, finish, workmanship, and arrangements for cleanliness, convenience, and economy. The grate-shank protruding affords convenience in rattling, while a "follower" prevents dust-escape. The illuminating doors are unique in being readily removable from hidden hinges for the purposes of cleaning. The "magazine" construction is such as to permit the use of either chestnut or stove coal. The upper fire-pot is provided with efficient gas-consuming arrangements, securing combustion of the gases and illumination of the upper chamber. Great convenience of cleaning the flues at their convergence is here provided.

In Ranges: The "Magee Standard Portable Range" presents excellence in its design, finish, and construction, and many points of convenience and utility. The space between the true and false bases of the oven furnishes a ventil-flue, through which the air from end apertures passes, and, being warmed, traverses the oven, and, escaping at the upper (fire-pot) angle, supplies the gas-burner of the fire-pot (meeting the roasting requirements). An extra number of shelves are attached to the range, as also double towel racks. It has extra closet capacity. It has a large encased copper hot-water tank, arranged for boiling or simply warming the water it contains, and having a spigot-attachment adjustable on front or end, not found in any other range. The arrangement of its water-back is such as not to interfere with the removal of clinkers, or the boiling process, or illumination doors. The removable non-cloggable ash-sifter is a special feature. It may have one or two hot closets, as desired.

In Furnaces: The "Magee Standard Plate Iron Furnace" presents merit as a healthful, convenient, economical, and inexpensive wrought-iron furnace. Its details for convenience, cleanliness, and economy in use are in part enumerated as follows. It has its dome of riveted boiler-iron, preventing escape of gas or dust into the air chamber. The double construction of its fire-pot provides for the delivery of air for the free combustion of gases. The automatic hood over the feed-door provides for the engaging and removal of gas and dust when the door is opened. Special facilities are provided for removal of clinkers, grate-shaking, and flue-cleaning, and the regulation of air currents. The improved double terra-cotta wall with air space between is a convenient improvement for setting. All castings are of elegance and excellence.

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5. Isaac N. Deardorff, Canal Dover, Tuscarawas County, Ohio, U. S.

IMPROVED SMOKE-HOUSE STOVE.

Report.—Commended for:

1. Economy of fuel.
2. Increase of smoke-volume.
3. Easy regulation and distribution.
4. Immunity from accidental fire.
5. Equalization of temperature.
6. Ability to consume wood whether green or dry.

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6. William H. Jackson & Co., New York, N. Y., U. S.

GRATES AND FENDERS FOR OPEN FIRES AND FIRE-PLACES.

Report.—Commended for the following reasons:

1. The material is steel wrought, instead of wrought iron.

2. The exhibit is brilliant, characterized by originality, great beauty of design, fine quality, workmanship, and finish.

3. The articles are in the highest state of finish, consisting of bronze of various shades, black enamel, and richly ornamented silver and gilt specimens.

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7. Christoph Reisner & Co., New York, N. Y., U. S.

SUMMER QUEEN OIL COOK STOVE.

Report.—Commended for the following reasons:

1. Its neatness, durability, simplicity, and safety.

2. It has a water reservoir directly over the oil tank, surrounding the wick tube and ratchets. The constant evaporation of the water avoids all odor.

3. The cylinder of the stove is attached by a hinge which allows of the stove being thrown back after heating, instead of being lifted off in a hot state. The whole apparatus is very complete, and economical as respects price.

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8. Fuller, Warren, & Co., Troy, N. Y., U. S.

STOVES, FURNACES, AND RANGES.

Report.—Commended for an unusually extensive, various, and artistic display of heating apparatus, indicating much taste and superior workmanship.

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9. The Open Stove Ventilating Co., New York, N. Y., U. S.

"THE FIRE ON THE HEARTH"—PARLOR STOVE.

Report.—Commended for the following reasons:

1. The combination is one apparatus, with three distinct modes of operation, *i.e.*, the air-warming capacity of a furnace, the reserve force of a close stove, and the ventilation of a fire-place.

2. The faculty of transmitting two currents, viz.: for the products of combustion to chimney flue, and for the supply of fresh air moderately warmed to the room for bodily comfort and respiration.

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10. Boston Soapstone Furnace Co., Boston, Mass., U. S.

SOAPSTONE FURNACE.

Report.—Commended for the following reasons:

1. Soapstone is a fine retainer and radiator of heat, and the heated air is free from the impurities resulting from burning the air against hot metal surfaces.

2. The equable and agreeable heat this furnace distributes.

3. Its property of withstanding intense heat without change of structure.

4. The ease with which it is managed.

5. Its immunity from accidental fire.

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11. John Grossius, Cincinnati, Ohio, U. S.

PATENT SCHOOL-HOUSE VENTILATING STOVE.

Report.—Commended for the following reasons:

1. Excellent workmanship, and usefulness of design.

2. Uniformity and equalization of heat; large radiating surface.

3. Thorough ventilation, the amount of fresh air from the outside being estimated at not less than three hundred cubic inches per second.

4 Powerful heating capacity, combined with unusual economy of fuel.

5. Its adaptation to any description of coal, hard or soft.

6. The fact that the gases are thoroughly consumed.
7. A good arrangement for schools, halls, and churches.
8. Extraordinary strength and durability.

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12. Henry Chatain, Washington, D. C., U. S.

OVEN FOR BAKERS, CONFECTIONERS, HOTELS, ETC.

Report.—Commended for the following reasons:

1. Its portability, compactness, and lightness.
2. Its rapid heating and efficient radiating qualities.
3. Its comparative cheapness and economy of fuel.
4. Its adaptability to family, boarding-house, or hotel use.

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13. Thomas S. Dixon & Sons, Philadelphia, Pa., U. S.

GRATES AND GAS LOGS.

Report.—Commended for the following reasons:

1. The grates, on account of their double heating capacity front and back, for the various forms of backs and checks for radiation of heat, their variable shaking ash (or bottom) grates, and the arrangement adopted to prevent dust when disturbing the fire.

2. The gas logs save gas and heat by the arrangement of making the lower sticks of the gas logs alive and the upper ones dead, the imitation of coal or wood perfect.

3. Durability, good workmanship, variety, and attractiveness of design characterize this exhibit.

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14. Bissell & Co., Pittsburg, Pa., U. S.

PEERLESS RADIATING SHAKING GRATE.

Report.—Commended for the following reasons:

1. Its construction secures economy and cleanliness.

2. It is not easy to clog the grate, or in any way interfere with its smooth and steady working.

3. Strength and durability.

4. The nature and arrangement of the bottom of the grate admit of the use of different kinds of fuel.

5. Beauty of style and finish.

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15. Bissell & Co., Pittsburg, Pa., U. S.

ISAAC DRIPP'S PATENT RAILROAD CAR HEATERS.

Report.—Commended for the following reasons:

1. Safety. The doors are arranged to close with strong brass spiral springs, and handles remain in possession of brakemen. The stove is thoroughly bolted to the floor.

2. Purity of air. The cold air is taken from outside of car and passed over a body of water held in bottom of stove, thus depriving it of dust, cinders, etc., and it is discharged at each seat perfectly pure and free from all dust.

3. An unusually large fire-pot, and large ash-box below, rendering it unnecessary to replenish the fuel except at long intervals.

4. Its capacity as a heater.

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16. Bissell & Co., Pittsburg, Pa., U. S.

PITTSBURG ELEVATED OVEN COOKING RANGE.

Report.—Commended for the following reasons:

1. Its adaptation to the use of bituminous coal.

2. Unusually large flues, separate rim at base to range, wide columns at sides, steam shelf, swinging hearth, swinging doors, extra weight and finish of castings.

3. Ornamental and attractive appearance.

4. Effective arrangement of the dampers, rendering it particularly easy of regulation and management.

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17. Chas. Noble & Co., Philadelphia, Pa., U. S.

STOVES AND RANGES.

Report.—Commended for superior casting, fine workmanship, variety of style and pattern, cheapness of production, combined with strength and durability.

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18. Richardson, Boynton, & Co., New York, N. Y., U. S.

IMPROVED FURNACES.

Report.—Commended for the following reasons:

1. Simplicity of arrangement and durability, superior heating power, and economy of fuel, conforming in its *modus operandi* to natural laws, the shape of the furnaces conducing to the more perfect combustion of coal.

2. The small number of joints, their position and manner of construction rendering them perfectly gas-tight.

3. The large amount of direct radiating surface.

4. The patent clinker-cleaning grate, by which ashes and clinkers can be removed without disturbing the fire, saving dust and time, preserving a bright, clear fire with little trouble, and requiring little power to shake it.

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19. Swett, Quimby, & Perry, Troy, N. Y., U. S.

EMPIRE HEATING RANGE.

Report.—Commended for the following reasons:

1. Plainness and neatness of design, excellent workmanship, smooth and finely proportioned castings.

2. Peculiarities of construction in fire-chamber, location and arrangement of flues, application of cold air, and boiling arrangement.

3. Large double ovens and capacious warming closets.

4. The fire-box passes from front to back of range, and is constructed with two grates, the rear grate being stationary, and a horizontal moving and dumping grate in front, so arranged that by no possibility can any dust or ashes pass into the room. The fire-chamber is divided in the middle by a very easily adjusted division plate, in which a brick is fitted, which forms the back of summer fire-box, so that in warm weather the size of the fire may be reduced to simply sufficient for cooking purposes, making the fire-box no larger than in an ordinary cooking-stove, and with this summer fire one or two fair-sized rooms may be warmed comfortably in ordinary winter weather.

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20. L. F. Duparquet & Huot, New York, N. Y., U. S.

COOKING RANGE AND COOKING UTENSILS.

Report.—Commended for the following reasons:

1. Economy of fuel and superior cooking qualities.

2. Capacity of urn, allowing of preparation of large quantity of coffee or tea at one time; also its preservation of the aroma and flavor.

21. Johnson, Black, & Co., Erie, Erie County, Pa., U. S.

BASE-BURNING STOVES AND FURNACE.

Report.—Radiant Home Stove commended for the following reasons:

1. Superior heating capacity. This is indicated by the construction of the fire-pot, in connection with outer casing, the joints of which are made with pockets, united by cement, rendering them perfectly air-tight, thus compelling all air admitted in lower part of stove to pass through the grate and basket fire-pot, by which the most perfect combustion and consequent maximum of heat are achieved.

2. The manner of construction for purpose of equalization of heat, which consists of a direct damper exit-flue near the top of the stove. The damper controlling the same is left with openings inserted so that when turned to give the reversible flue draft it at the same time allows a partially direct draft, thus heating top and bottom alike; and also carrying off the gas, which otherwise accumulates in the upper part of the stove, and escapes, more or less, into the room.

3. The easy and effectual method of getting rid of débris. By use of a lever the teeth of a cut-off or fork device are thrust through openings in the fire-pot, at a point between the burning coal and débris, thus holding the fire in position, while by withdrawing a slide in the grate all slate, ashes, and clinker are precipitated into the ash-pan. For the ease with which this is accomplished, its effectiveness and cleanliness (there being no open door to allow of escape of dust or gas), this admirable provision merits special mention.

The Radiant Home Furnace involves the application of the same principles included in the construction of the stove alluded to, with the addition of the introduction in the furnace of large mica windows, intended, not for illumination, but for the rapid radiation of heat, this article being found to have a greater capacity for heat and a better radiation than iron.

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22. Richardson, Boynton, & Co., New York, N. Y., U. S.

BALTIMORE FIREPLACE HEATER AND FRANKLIN TILE PORTABLE STOVE.

Report.—Baltimore Fireplace Heater commended for the following reasons:

1. Great power in heating.
2. Durability, economy of fuel.
3. Simplicity of construction.
4. Attractiveness of appearance.
5. Ease of management.
6. The magazine is heavy, durable, and has a sectional open top.
7. Other advantages are its clinker-cleaning anti-friction shaking grate; its single damper controlling the draft; its dust-flues for the escape of dust; the arrangement of the reversible flues, and smoke-pipe attachment, allowing the heater flues to be cleaned without trouble or inconvenience.

Franklin "Tile" Portable Stove. A very rare style of stove; top, sides, and front made of "English tile," which gives a soft, mellow heat, and is a better retainer of heat than cast iron. It has in front of the body of fuel an illuminated close hot-air chamber, preventing cold air from coming in contact with the fuel, thereby keeping a continuous fire, and allowing only heated air to pass to support combustion; has a grated fire-pot so arranged that air circulates when admitted on all sides as well as under the grate. The stove is cheerful and brilliant in appearance, attractive and elegant in design, and especially adapted for heating sick-rooms, libraries, and offices. Commended for superior heating qualities.

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23. Job Bartlett & Sons, Philadelphia, Pa., U. S.

WROUGHT-IRON WARM-AIR FURNACES FOR BURNING ANTHRACITE AND BITUMINOUS COAL OR WOOD, AND LONDON KITCHENERS AND CHARCOAL BROILERS.

Report.—The warm-air furnaces are commended for the following reasons:

1. Among the advantages are the air-tight draft door; method of introducing cold air; extent of radiating surface; patent dust flue; appliances for the consumption of gas, and patent shaking and dumping grate.

2. Over the fire, and inclosing it, is a large wrought-iron pyramid. This is placed over the body of the fire with an air-tight joint. The brick-work is made hollow for the supply of cold air, and on the inside is furnished with a large number of pipes through which the supply passes.

3. Another advantage is the arrangement of the radiating surfaces, by which the whole of the heat generated by the combustion of the fuel is secured for the registry. Whatever heat leaves the pyramid over the fire unappropriated is led with the smoke into two upright iron receptacles made of as well-selected and stout iron as the pyramid, by which the balance of the heat is given off for the registers before the flue is reached.

4. Durability of construction.

5. Heat generated causing no red-hot surfaces.

The London Kitcheners and Charcoal Broilers are commended for the following reasons:

1. Strength and durability.
2. Simplicity and economy.
3. Facility of management.
4. Quick heating quality, reliability, and thorough ventilation.
5. Suitability for large hotels, entertainments, etc., as well as private dwellings.

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24. Detroit Stove Works, Detroit, Mich., U. S.

STOVES FOR PARLORS, HALLS, AND STORES.

Report.—Commended for general elegance of outline; beauty of design; perfectness of mounting, fitting, and trimmings; general fine workmanship and appearance.

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25. Mark Feetham & Co., London, England.

GRATES AND FIRE-PLACES.

Report.—Commended for highly artistic designs, excellence of material, very superior workmanship, combined with great practical utility.

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26. A. M. Perkins & Son, London, England.

HIGH-PRESSURE STEAM BAKING OVEN.

Report.—Commended for the following reasons:

1. Excellence of design and workmanship, and ready adaptation to its contemplated use.

2. The facility with which the oven can be heated in a very short time to 500° Fahrenheit, and an equable temperature maintained.

3. The tubes of which (?) composed being independent of each other, should one give out, the working of the oven is not necessarily interfered with.

4. The exhibit indicates novelty and efficiency.

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27. Henry Belezikewicz, Warsaw, Russia.

PORTABLE COOKING APPARATUS HEATED BY PETROLEUM, WITH KITCHEN UTENSILS.

Report.—Commended for compactness, attention to details, superior workmanship, and ready adaptability.

28. **Metallurgical Company of San Juan de Alcaraz, Albacete, Spain.**

BRASS STOVES, SPANISH BRAZEROS, CRUET STANDS, COCKS, KITCHEN UTENSILS, AND HEATERS.

Report.—Commended for superior quality of metal used in construction, excellent stamping and finishing, variety of designs, skill in workmanship, and adaptation to the public needs.

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29. **Drammen Foundry and Mechanical Works, Drammen, Norway.**

STOVES.

Report.—Commended for superior castings, beauty and variety of design, and skillful workmanship.

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30. **F. A. Kerl's Heirs, Patten, near Karlsbad, Austria.**

WHITE METAL AND TURNED SPOONS.

Report.—Commended for excellence of manufacture and extraordinary cheapness for common use.

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31. **Geo. I. Mix & Co., Yalesville, Conn., U. S.**

IRON AND BRITANNIA SPOONS, FLESH FORKS, AND WATER COOLERS.

Report.—Commended for the following reasons:

1. Taste and skill in design, and superior workmanship.
2. The water coolers are manufactured with a view to strength, durability, and cleanliness, and include in their construction the best non-conducting medium.

Between the tank and the outside case is a filling of calcined plaster wet with strong salt-and-water; after settling, this becomes of stony hardness, thus proving not only a non-conductor, but a brace to the apparatus.

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32. **Eldridge J. Smith, Philadelphia, Pa., U. S.**

DOUBLE GRIDDLE.

Report.—Commended for the following reasons:

1. A reversible small oven, with double coverings and handles.
2. Simple, economical, and efficient in baking, stewing, and broiling.

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33. **Newark Tea Tray Co., Newark, N. J., U. S.**

TRAYS AND WAITERS (JAPANNED).

Report.—Commended for extent, variety, and richness of display, beauty of design, and excellent workmanship.

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34. **Musgrove & Son, New York, N. Y., U. S.**

PLANISHED AND JAPANNED TIN-WARE.

Report.—Commended for the great diversity of designs for wedding presents, excellence of material and workmanship, and general attractiveness.

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35. **James H. Corey, New York, N. Y., U. S.**

IMPROVED CULINARY BOILER WITH STEAM VALVE ATTACHED.

Report.—Commended for the following reasons:

1. The rapidity with which boiling is effected.
2. Economy of steam.

3. Improvement in quality of cooking.
4. Durability.
5. Its adaptability to a large variety of uses in large restaurants and hotels.

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36. Ansonia Brass and Copper Co., New York, N. Y., U. S.

PATENT SPUN BRASS KETTLES.

Report.—Commended for the following reasons:

1. General excellence of texture and finish.
2. The absence of seams, the brass kettles being spun from metal plates.
3. Taste and skill in workmanship.

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37. Manning, Bowman, & Co., West Meriden, Conn., U. S.

TEA AND COFFEE POTS AND URNS.

Report.—A most extensive display of tea and coffee pots and urns, of britannia and nickel finish. Commended for:

1. Superiority of workmanship and elegance of design.
2. Cheapness, durability, and adaptability to practical use.

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38. Mrs. Charlotte H. Sterling, Gambier, Knox County, Ohio, U. S.

DISH WASHING AND DRYING MACHINE.

Report.—Dish washing and drying machine, for washing and drying dishes without the wetting of the hands or the use of brush or cloth of any kind.

Commended for the following reasons:

1. Its portability, simplicity, and compactness.
2. The thoroughness of the operation, and the avoidance of breaking or nicking of plates and dishes.

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39. St. Louis Stamping Co., St. Louis, Mo., U. S.

GRANITE IRON WARE.

Report.—Commended for the following reasons:

1. A fine exhibit of kitchen and culinary wares.
2. Excellent enameled sheet metal ware, unaffected by acids or extreme heat.
3. General taste and skill of workmanship.

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40. Lalance & Grosjean Manufacturing Co., New York, N. Y., U. S.

SHEET METAL CULINARY UTENSILS.

Report.—Sheet metal culinary utensils, stamped or pressed, from iron, brass, copper, and tin plate, hammered, polished, re-turned and plain, planished, enameled, or marbleized.

Commended for the following reasons:

1. General superiority of exhibit.
2. Enameled; superiority of color, and more flexible in quality.
3. Planished ware of high quality and excellent color.
4. Marbleized (stamped iron ware), a remarkably tough and durable enamel, incorporating itself thoroughly in the pores of the sheet iron, and is unaffected by excessive heat, or acids of any description; does not flake off with use.

41. J. Hall Rohrman & Son, Philadelphia, Pa., U. S.

GROCERS' COFFEE, TEA, AND SPICE CADDIES AND SCALES, AND SAFE DEPOSIT BOXES FOR BANKS, SECURITY COMPANIES, ETC.

Report.—Commended for the following reasons:

1. New and original designs in ornamentation.

2. Admirable workmanship and decoration, inviting the *closest scrutiny.*

3. The marked attention bestowed upon the minutest details, *challenging criticism,* smoothness of finish, and adaptability to the uses contemplated by their manufacture.

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42. Jonathan Miller, Meriden, Conn., U. S.

COFFEE, TEA, AND EXTRACT PRESS.

Report.—Commended for the following reasons:

1. Pressure is caused by the expansion of the material used; prevents the generation of steam and the escape of the liquid until the extract is perfectly formed. It also measures the material and liquid, strains the extract, and prevents the strainer from being clogged by the sediment.

2. The presses by which this process is put into practical use are so arranged that any amount of material may be used, from ounces to tons, and the quantity as perfectly extracted in either. They are all provided with floats which prevent the steam or vapor from forming after the extract is completed, thereby retaining the flavor longer than can be done in any other way.

3. By means of this pressure, sediment is racked from the liquid before coming in contact with the material.

4. The simplicity and cheapness of the arrangement, and facility with which it is operated.

5. The successful manner in which tea and coffee can be successfully prepared with cold water as well as heated.

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43. Woods, Sherwood, & Co., Lowell, Mass., U. S.

WHITE LUSTRAL WIRE WARE.

Report.—Commended for the following reasons:

1. It is entirely novel.

2. It fully supplies the place of britannia and more expensive wares.

3. It is of superior strength, considerable elegance of design, and great neatness of workmanship and finish.

4. It is of great variety.

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44. Missouri Valley Novelty Works, St. Joseph, Mo., U. S.

COMBINATION KITCHEN SAFE.

Report.—Commended for its compact and convenient form, containing the necessary groceries for family use. An excellent design, well constructed and arranged.

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45. Dr. G. W. H. Calver, Columbus, N. J., U. S.

HOUSEHOLD IRONING MACHINE.

Report.—Commended for the following reasons:

1. Its ready adaptability to any household where a cook stove or gas is used.

2. Its application to all varieties of clothes-ironing where a mangle can be used, and the ability with which it irons clothes containing buttons, without breaking, and also leaving the material as dry and healthful as by the sadiron.

3. Economy of time and fuel, and the ease with which it is operated by one in the sitting position.

4. Its adaptation to private families, hotels, and laundries.

5. Cheapness and durability.

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46. Dover Stamping Co., Boston, Mass., U. S.

DOVER EGG BEATER.

Report.—Commended for, 1, its simplicity, rapidity of action, and efficiency. 2. Its peculiar merit consists in two revolving floats turning on two centres, so near together as to cause each to interlace with or cut the orbit of the other. The effect is to draw the eggs or other articles to be beaten within the orbits of the beater, instead of dispersing it by centrifugal force to the periphery of the circle of the vessel.

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47. Reading Hardware Co., Reading, Pa., U. S.

APPLE PARER.

Report.—Commended for the following reasons:

1. Superiority in mechanical construction and arrangement.

2. The facility with which it removes the entire covering of the fruit in an incredibly short period.

3. Its working parts project from the table or stand to which it is fastened, so that the parings fall into a receptacle for that purpose without clogging the machine in any manner.

4. By means of the "push-off lever," a recent improvement, the fruit is effectually removed without handling.

5. The shafts being square on the ends, they cannot become loose and turn in the wheels of the machine.

6. Its compactness and portability.

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48. W. S. Carr & Co., New York, N. Y., U. S.

BATH-ROOM FURNITURE; PATENT AMERICAN DEFIANCE WATER-CLOSET.

Report.—Commended for the following reasons:

1. The bath-room suite is of American wood casing, most artistically and elegantly finished, and consists of bath-tub, water-closet, washstand, and bidet; also supply waste and secret overflow for bath, washstand, and bidet. A most ingenious and effective contrivance.

2. The water-closet is noticeable on account of the large quantity of water retained in the bowl, perfect sealing of overflow, and impossibility of smell.

3. The ease with which it is removed and repaired without disturbing the seat.

4. Manufactured of china and earthenware, without any putty or cement used in their construction.

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49. Ethelbert Watts, Philadelphia, Pa., U. S.

COMBINATION BATH TRUNK.

Report.—Commended for its portability and combination with a traveling hand-trunk of convenient size and shape for transportation, its prompt and ready arrangement and adaptation to the purposes of bathing where more permanent fixtures are inaccessible.

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50. Dr. David B. Sturgeon, Toledo, Ohio, U. S.

AMERICAN DEPURATORY BATH.

Report.—Commended for the following reasons:

1. Its compactness and adaptability of form for the purposes for which constructed; also

because by its use the hot-air and vapor baths are administered under circumstances more in accordance with the laws of physiology than those usually exhibited.

2. By this bath, pure air is respired at a temperature below the normal standard of the blood, the result of which is that the force and frequency of the pulse are not greatly augmented, and there is less tendency to congestion of the brain being induced than when air at a high temperature is respired, thus obviating the necessity of applying ice water to the head, which prevents the depuration of effete matter from the surface to which the cold water is applied.

3. During the entire time of bathing, the person is completely protected from the inhalation of effete matter or poisonous exhalations from his own body or the bodies of other bathers.

4. The submerging of the body in water arrests depuration from the skin, whereas by the application of water in sprays, as in this bath, the elimination of effete matter is rapidly increased.

5. It admits of the administration of medicated vapors.

6. It is fully adapted to all the needs of household, public, and hospital use.

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51. Peter Carrigan, Philadelphia, Pa., U. S.

PLUMBERS' COPPER WORK; BATH-TUBS, FOOT-TUBS, SINKS, AND COPPER KITCHEN UTENSILS.

Report.—Commended for the following reasons:

1. Very superior material and workmanship.

2. The bath-tubs are so constructed that no shrinkage or cracking of the wood affects the close adhesion and smoothness of the bottoms and sides.

3. Strength and durability.

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52. C. A. Blessing, Philadelphia, Pa., U. S.

COPPER BATH-TUBS AND COMBINATION COCK FOR BATH-TUB.

Report.—The copper bath-tubs are commended for the following reasons:

1. Beauty of design, excellence of material and workmanship.

2. They are so shaped as to leave no flat surface where water or sediment can remain to corrode the lining; but, being made to slope toward the centre, the water flows off quickly after removing the plug, leaving the tub comparatively dry. Besides, the lining fits more closely to the wood-work, and is less liable to bulge up and leave an uneven surface.

The combination cock is commended for—

1. Its simplicity, easy management, and practical utility.

2. It consists in the combination, with the waste pipe issuing from the bottom of a bath-tub, of an overflow tube or pipe, which operates in the manner of a siphon, and is so contrived that the water will gradually rise in said tube to the level of the water in the tub, and will run off into the waste pipe when the proper amount of water is in the tub.

3. The invention also consists in the combination with hot and cold water supply pipes, a shower-bath pipe, and a waste pipe, of a four-way cock, which is so constructed and arranged that the hot and cold water can be admitted through the bottom of the tub, either separately or mixed, and can also be caused to flow into the shower pipe while the water from the tub is running off through the waste pipe.

4. It further consists in the combination, with a tub having counter-sunk or struck-up recesses in its sides, of a detachable seat, which is held in place by a sliding clamp and thumb-screw.

5. The perfection of its combination, strength, durability, and non-liability to get out of order.

53. Henry C. Meyer & Co., New York, N. Y., U. S.

THE FULLER PATENT FAUCET.

Report.—Commended for the following reasons:

1. The impossibility of leakage from constant and long use, having a metal seat and an elastic valve, which valve is so arranged as to receive the pressure of water towards the seat, and thus having a constant tendency to tightness.

2. The facility with which the faucet is opened or closed.

3. The water being entirely excluded from the chamber of the cock when closed, the faucet cannot be injured by the freezing of the pipe.

4. It is equally adapted for hot or cold water.

5. It can easily be taken off by simply unscrewing the body of the cock from the shank.

6. Strength and durability.

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54. Redlich's Manufacturing Co., Chicago, Ill., U. S.

WOODEN FAUCETS SATURATED WITH INDIA RUBBER.

Report.—Commended for the following reasons:

1. Absence of corrosion and oxidation.

2. The complete saturation with india rubber, thus filling thoroughly and permanently the pores of wood and cork.

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55. Otto Zwietusch, Milwaukee, Wis., U. S.

CRYSTAL FAUCET DRAUGHT APPARATUS.

Report.—Commended for the following reasons:

1. The material (glass) is preferable to pure metal, and admirably adapted to soda fountains, etc.

2. Well adapted to chemical and pharmaceutical uses.

3. The absence of screws, the faucets being applied and displaced without delay.

4. The air-escape arrangement. The air chamber is placed above the draught tube; easy to open from the outside. Any gas or air remaining in the pipes or cooler concentrates in this chamber, instead of passing through draught tube, thus preventing sputtering. All extensions and connections of the cooler are out of the way of the ice (they are beneath and between the syrup cans or tanks, to prevent their being damaged or injured), which can be put in the apparatus in large blocks, instead of crushing it, thus saving labor and expense.

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56. Henry C. Meyer & Co., New York, N. Y., U. S.

MURDOCK'S PATENT ANTI-FREEZING HYDRANT.

Report.—Commended for the following reasons:

1. Its simplicity, durability, and facility with which it can be repaired without removing the stock or case from its position in the ground.

2. The case or stock is of iron.

3. An ingenious contrivance by which the waste water is allowed to flow off, thus effectually preventing the freezing of the hydrant in cold weather.

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57. Jacob H. Polhamos, New York, N. Y., U. S.

REFRIGERATING CUPBOARD AND SAFE.

Report.—Commended for the following reasons:

1. Its adaptation to summer and winter use,—as a refrigerator in summer, and a safe in winter.

2. The ice being placed at the bottom, there can be no dampness, damp air being heavier than common air, and therefore incapable of rising.

3. Economical in the use of ice, as there is no draft over the ice, while the ventilation through the top is perfect.

4. The doors have loose joint hinges, admitting of their being lifted off and substituted by wire screen doors for winter use.

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58. Smith Refrigerator Co., Albany, N. Y., U. S.

DRY AIR REFRIGERATOR.

Report.—Commended for the following reasons:

1. The extraordinary dryness of the air chamber, and its consequent preservative qualities.

2. Its non-conducting walls, in sections, and the construction of the same.

3. The non-conducting chambers contain pure dry air, secured within walls saturated with paraffine, thus obviating the slightest mould, must, or dampness.

4. Its economy of ice and its ready adaptation to family use, or that of large buildings, railroad cars, etc.

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59. Alexander M. Lesley, New York, N. Y., U. S.

ZERO REFRIGERATOR.

Report.—Commended for the following reasons:

1. Beauty of design and excellent workmanship.

2. The absence of all communication between the ice and provision chamber.

3. The absence of moisture on the inside lining.

4. The impossibility of contact of hot air with the ice, except when the waste of ice is supplied, requiring the opening of the door.

5. The condensation of the moisture contained in the provision chamber on the cold surface of the ice-box, which running into a trough is passed out through a pipe at the bottom.

6. The economy of ice, and uniformity of temperature.

7. The filling of the refrigerator, which is cork, a good non-conductor, cleanly and odorless.

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60. Sidney Shepard & Co., Buffalo, N. Y., U. S.

ICE-CREAM FREEZERS, PATENTED PALACE COAL VASES, NOVELTY OIL CANS.

Report.—Commended for the following reasons:

1. Simplicity and strength of construction of ice-cream freezer in its various parts, and perfection of fitting together.

2. Small power required to work them.

3. The uniformity, firmness, smoothness, and lightness which the frozen cream presents.

4. In the large power or hand freezer, the readiness by which the freezer can be connected or detached by the *clutch* when the fly-wheel is in motion.

5. The quality and ornamental design of the coal vases, including receptacle for the fire irons and the top plate, with hooks for holding them in place.

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61. Charles G. Blatchley, Philadelphia, Pa., U. S.

HORIZONTAL ICE CREAM FREEZER.

Report.—Commended for the following reasons:

1. Economy of ice, being perfectly air-tight.

2. Economy of labor, there being scarcely any resistance to be overcome in its operation.

3. Economy of time.

4. Uniformity and perfection in the results attained.

5. Durability; all the important castings used being of best annealed metal, either tinned or galvanized.

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62. David W. Low, Gloucester, Mass., U. S.

ICE CRUSHERS.

Report.—Commended for the following reasons:

1. The readiness with which the feed of the machine can be changed at the option of the operator to render the broken ice fine or coarse, and without stopping or checking the operation of the machine.

2. These consist of teeth on shafts revolving in opposite directions, one slower than the other, acting as a feeder as well as breaker.

3. The rapidity and ease of its operation.

4. The uniform size of the ice broken, which goes further and is more efficient in fish packing, freezing ice-cream, etc.

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63. C. W. Packer, Philadelphia, Pa., U. S.

COG-WHEEL AND DOUBLE-ACTION ICE-CREAM FREEZER.

Report.—Commended for the following reasons:

1. Durability and excellent construction.

2. The simplicity and perfection of the mechanical arrangements, by which cream, fruits, etc., are frozen.

3. The novel construction of the dasher or beater, having, in addition to a pivoted spring scraper conforming itself closely to the inner surface of the can, which removes the frozen cream as rapidly as formed, deflectors attached to and forming a part of the beater, which act upon the frozen cream in the same manner as a paddle in freezing by hand, and also direct the unfrozen portions to the sides of the can, by which the whole body of cream is constantly changing position, and is most thoroughly beaten, thus insuring rapid freezing, and also producing the smoothness and richness requisite in good ice-cream; also the action of the deflectors in combination with the lifters or cutters, producing the greatest amount of agitation, renders it unnecessary that the small or family sizes should be made with double gearing.

4. The dashers are galvanized instead of tinned, thus rendering them more solid and durable, unaffected by chemical acids, and leaving no metallic taste in the cream.

5. The facility with which the detachable hinged cover is instantly removed, thus giving free access to the can.

6. Its adaptation not only to family purposes, but for the use of confectioners, hotels, steamships, etc.

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64. Robert Ulrich Etzensberger, London, England.

APPARATUS FOR MAKING INFUSIONS OF COFFEE, TEA, ETC.

Report.—Commended for the following reasons:

1. The rapid and complete infusion in large or small quantities, without direct contact of the source of heat with the parts containing the substance or substances to be acted upon.

2. Its general adaptability to both household and public use.

3. Its compactness, ready adjustability, and design of mechanical parts as applied to the particular object of making infusions.

65. George Cheavin, Boston, Lincolnshire, England.

PATENT RAPID WATER FILTERS.

Report.—Commended for the following reasons:

1. Rapidity of filtering process, especially in its application to river, rain, lake, or pond water, however foul, effectually relieving it of all impurities and organic matter.
2. Simplicity of construction.
3. Facility with which cleansed.
4. Durability.

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66. George Jennings, Stangate, London, England.

TIP-UP WASH-BASIN, VALVE WATER-CLOSETS AND TRAPS, KITCHEN AND SLOP SINKS, BATH-TUB, WATER-METERS, AND WATER-WASTE PREVENTERS.

Report.—A splendid display of goods, characterized by beauty of design, skillful workmanship, simplicity, cleanliness and durability, efficiency, and novelty of application.

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67. Dillwyn Smith, Liverpool, England.

APPARATUS FOR DISINFECTING CABINS AND HOLDS OF SHIPS, WARDS OF HOSPITALS, ETC.

Report.—An admirable apparatus for the purpose intended.

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68. Air-Burning Co. (Limited), Glasgow, Scotland.

AIR-BURNING FLAT-IRONS.

Report.—Commended for the following reasons:

1. The peculiar mode of heating by a combination of atmospheric air with gas previous to ignition in proportions which effect complete combustion.
2. A regular steady heat is generated at any temperature.
3. The iron can be heated ready for use in two minutes.
4. The heat can be turned off or on, increased or reduced, at pleasure, the flat-iron being heated intensely is always clean, and, as no furnace is used, the ironer never requires to leave the table.
5. More work can be done in a given time by this apparatus, and at cheaper rates. The finish is superior, without the stains in ordinary ironing.

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69. Alexander Anderson, Canada.

BREAD-KNIFE.

Report.—Commended for the following reasons:

1. A ragged-edge knife, moving in a graduated groove, and slicing bread with great rapidity and precision of any width.
2. Its cheapness, simplicity, and durability.

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70. James McElvey, St. Catherine's, Canada.

CREAM GATHERER.

Report.—Commended as an ingeniously devised and valuable means of preserving milk and cream in sweetness and purity.

71. N. & J. Tremouroux Brothers, Brussels, Belgium.

UTENSILS FOR HOUSE USE IN POLISHED, VARNISHED, BRONZED, TINNED, AND ENAMELED CAST IRON.

Report.—Commended for great variety of goods, skill and smoothness of work, perfect whiteness of enamel, and general excellence.

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72. Adolphe Le Tellier, Brussels, Belgium.

FILTER.

Report.—Commended for the following reasons:

1. It has admirably combined all the good qualities of a good practical filter.
2. Superior workmanship.
3. Moderate expenses.

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73. Francisco de Paula Isaura, Barcelona, Spain.

BRASS AND PLATED-BRASS BRAZERO HEATERS, KITCHEN UTENSILS, CANDLESTICKS, CHIMNEY RANGE, FIRE-POKER.

Report.—Commended for originality, excellence of stamping, and superior workmanship.

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74. Joh. Georg Normann, Nuremberg, Germany.

FORMS (TIN) FOR CONFECTIONERS.

Report.—Commended for the extraordinary number and variety of moulds for confectioners' uses; excellence of material and workmanship.

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75. C. Blunck, Christiania, Norway.

GUN-METAL WATER GAUGES, STEAM VALVES, STEAM COCKS, STEAM JOINTS, AND WATER-CLOSETS FOR SHIPS.

Report.—Commended for excellence of material and general good workmanship.

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76. M. E. Nord & Son, Christiania, Norway.

REFRIGERATOR.

Report.—Commended for good workmanship, economical arrangement, and admirable adaptability to the purposes of a family refrigerator.

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77. A. G. Myers, New York, N. Y., U. S.

FIELD'S FLUSH TANK.

Report.—It performs in a very satisfactory way the work of flushing a drain or sewer on a plan that is novel, ingenious, and, to a good degree, effective.

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78. Simes & Tate, Philadelphia, Pa., U. S.

THE SPONGIO-KAOLIN WATER FILTER.

Report.—Commended for the following reasons:

1. Simplicity of construction, convenience of form, and thoroughness of execution.
2. Its ready adaptation to any hydrant, and its comparative indestructibility.
3. The composition of the filtering pad, which is an original invention, consisting of fur, sponge, kaolin, and charcoal woven together into a compact, inseparable, and indestructible disk or pad, through which the water passes, leaving all sediment and impurities upon the upper side.
4. The facility with which the sediment is washed off by simply inverting the filter.

79. Cooper, Jones, & Cadbury, Philadelphia, Pa., U. S.

WATER-CLOSETS, COMPRESSION FAUCETS, PUMPS, FOUNTAIN JETS, AND WATER GAUGES.

Report.—Commended for the following reasons:

1. Completeness of exhibit, excellent designs, and general good workmanship.

2. The superiority of the water-closet exhibit, combining simplicity, compactness, originality, and sound sanitary principles. The method of controlling the vacuum chamber is quite original; also regulation of the screw, which admits of the widest range in amount of water supplied at any one operation of the closet, being capable of variation of from one gill to one hundred gallons at pleasure. It works equally well under three pounds as one hundred and sixty pounds pressure, and avoids concussion in closing.

3. The mode of packing their compression cocks and preventing leakage; also its simplicity.

4. Their brass finishing lathe, in the play of tool-elevating or adjusting arrangement; in the design of slide which brings both handles in front; also in the arrangement of the screw-chasing gearing and of the cross-stop motion on the tail stock, all indicating originality and adaptability.

5. General excellence of the exhibits.

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80. W. F. Wheeler, Boston, Mass., U. S.

DISINFECTOR APPARATUS.

Report.—This apparatus of various devices seeks to disinfect water for urinals, water-closets, etc., by making a solution of carbolic acid or other disinfecting agent, in soap form, in an enclosed cup, from which it passes directly to the foul surfaces.

Commended for the following reasons:

1. It is entirely novel.
2. Very efficient.
3. Applies the agent exactly as wanted.
4. It is economical.

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81. F. J. Delker, M.D., Philadelphia, Pa., U. S.

WATER FILTER.

Report.—Commended for the following reasons:

1. Its durability.

2. Its mechanical arrangement, consisting of a conical-shaped cylinder (of iron or terra-cotta) widest at the bottom; a filtering jacket of a conical shape, widest at the top, secured by flanges to the outside cylinder, the outlet or pure-water pipe being in the centre, and retained in position by flanges; the intervening space is filled and packed with filtering material, such as gravel, pumice-stone, charcoal, or any other substance best suited for the various waters containing organic matter in suspension. The water entering at the top circulates around the jacket through its perforating and filtering material into the outlet or pure-water pipe, which is similarly perforated, passing out in such stream as the hydraulic pressure admits. The filter is regulated for size and capacity according to such pressure from one up to forty-eight inches' outlet. Ample space is afforded in the bottom for the collection of all impurities, where, owing to the conical shape of the jacket or cylinder, matter held in suspension will collect. Specific provision is made for cleaning by the addition of a mud outlet at the bottom, by which, at will, the whole force of the inlet water is expended in cleaning either by reversion of inlet-pipe to the pure-water outlet, or by allowing the pure water already in the house, with the supply stream, to escape through the mud spigot.

3. Its facility in purifying the largest stream, as well as for the minor domestic uses.

4. Its capacity of thorough filtering without delaying the water supply.

82. Austin, Obdyke, & Co., Philadelphia, Pa., U. S.

A GALVANIZED IRON EXPANDING WATER CONDUCTOR.

Report.—Commended for:

1. A conductor so constructed as to yield to the expansive force of the water that may become frozen therein, and thus prevent the pipe from bursting in winter.
2. Excellence of workmanship and material.

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83. Moorhead Clay Works, Philadelphia, Pa., U. S.

DRAIN AND SEWER PIPES.

Report.—This is a very superior, extensive, and varied exhibit of terra-cotta ware. The material is of the finest character; the workmanship the best.

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84. Isidor Brach, Philadelphia, Pa., U. S.

REVERSIBLE WATER FILTER, WATER COOLER WITH COMBINATION ICE CAN AND FILTER COMBINED.

Report.—Commended for the rapidity and thoroughness of the filtering process, the felt used collecting the impurities from the outside, and the compressed intermediate carbon purifying and deodorizing the fluid.

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85. Wakefield Earth Closet Co., New York, N. Y., U. S.

EARTH CLOSETS AND CABINET EARTH CLOSETS.

Report.—Commended for the following reasons:

1. Unusual capacity of reservoir, rendering filling less frequent.
2. Automatic arrangement by which the closing of the lid distributes the necessary quantity of earth.
3. Durability, handsome appearance, and cheapness.
4. The cabinet closet and earth chamber pail are characterized by lightness, portability, simplicity, durability, and capacity.

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86. Charles E. Fowler, New Haven, Conn., U. S.

PLANS OF SEWERAGE AND DRAINAGE.

Report.—It is a neat and systematic manner of keeping the plans, records, and information concerning the public work of the city. The execution is admirable throughout.

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87. J. D. Cook, Toledo, Ohio, U. S.

WATER TANK FOR PUBLIC WATER SUPPLY.

Report.—Commended for the following reasons:

1. Its economy of fuel and labor.
2. Its prevention of fluctuations in water pressure, incident to suddenly opening and closing fire hydrants and other effluent openings.
3. Its avoidance of intermittent piston velocity.
4. Its assured greater immunity from accidents and repairs, thus prolonging the efficiency and life of pumping engines.
5. The auxiliary or small stand-pipe is an ever-ready medium for securing the necessary fire pressure, independent of the tank when the flow line in the latter shall have been reduced by domestic supply.

88. **The Odor.ess Excavating Apparatus Co., Baltimore, Md., U. S.**

APPARATUS FOR EMPTYING CESSPOOLS, ETC.

Report.—Commended for the following reasons:

1. Superior efficiency, the pump and valves being of entirely novel construction, which enables the refuse usually found in sinks to pass freely through without clogging.

2. Economy, the work being accomplished in the daytime with far greater facility than by the old method.

3. The great sanitary advantages it presents, the operation being effected without the least odor or offense, the air being thus relieved of noxious and poisonous gases.

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89. **George Wagner, Washington, D. C., U. S.**

TRANSPARENT GLASS VENTILATOR.

Report.—Commended for the following reasons:

1. The ventilator is of glass, and applied in pairs to windows, one upon the inside of the lower sash, and one upon the outside of the upper sash, so as not to interfere with the opening and closing of either sash.

2. The ventilator admits of a variety of decoration.

3. Its qualities as a true ventilator are good, while its transparency allows the free admission of light and sunshine.

4. It is exceedingly simple in construction and economical in price.

5. It is readily adapted to all sorts of windows.

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90. **J. W. Bracher, Protective Ventilator Co., New York, N. Y., U. S.**

VENTILATORS.

Report.—The fixture designed by this exhibitor for application to the windows of rail-cars or houses (the sash being raised a few inches to allow of its insertion), whereby the air is brought in with an upward inclination, passed through a porous agent, as cotton or loose felt, and so deprived of undue force and of its contained dust and dirt, constitutes, in my judgment,—

1. A novel improvement in ventilating apparatus that meets, to a considerable degree, a want (particularly as adapted to rail-cars) for a ventilator and dust-trap combined.

2. An apparatus of inconsiderable expense.

3. An apparatus of general availability.

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91. **Lewis W. Leeds, New York, N. Y., U. S.**

DIAGRAMS FOR VENTILATING AND HEATING.

Report.—These diagrams illustrate in a variety of ways, and with great skill, the true principles of ventilation and heating as applied to dwellings, etc.

They are perfect in plan and detail.

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92. **The Tuttle & Bailey Manufacturing Co., New York, N. Y., U. S.**

VERTICAL WHEEL REGISTERS FOR HEATING AND VENTILATION.

Report.—Commended for the following reasons:

1. A complete exhibit embracing every variety of registers for heating and ventilation.

2. Superior movements, having little friction, and not liable to get out of order.

3. Superior castings and general workmanship.

4. Variety, permanency, and inexpensiveness of finish.

5. Taste and originality, combining elegance with strength.

93. J. C. Bates, Philadelphia, Pa., U. S.

VENTILATORS.

Report.—The adjustable ventilators, arranged for attachment to the top and bottom rails of the sashes of a window (thus providing for a double current of air, susceptible of regulation without the raising or lowering of the sashes, and directing the current at such an angle as not to impinge upon the person), seem to constitute:

1. A novel improvement in ventilating apparatus on sound principles.
2. A fixture of small expense; and
3. An improvement of general availability.

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94. S. A. Wight, Philadelphia, Pa., U. S.

VENTILATOR AND DUST-TRAP.

Report.—The apparatus of this exhibitor, which is a simple arrangement whereby air is received through wire netting under a show window, and, passing through a shallow air-box under the floor of the window, has its dust engaged by interdigitating leaves, and is discharged above and behind the fruit or other article exhibited, has these merits:

1. It quite effectively cools the fruit, etc., under and behind which it passes.
2. It engages the dust that would be thrown upon the goods.
3. It is inexpensive and easy of application.
4. It is novel.

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95. George Pepper, Windsor, Victoria, Australia.

CEILING AND WALL VENTILATORS.

Report.—They are well adapted for aiding, in their respective forms, in promoting ventilation.

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96. Edward Murphy, Melbourne, Victoria, Australia.

CENTRE FLOWERS AND VENTILATORS.

Report.—They are well adapted for aiding in promoting ventilation, in their respective forms.

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97. Cornelius & Sons, Philadelphia, Pa., U. S.

GAS FIXTURES.

Report.—Commended for the following reasons:

1. Extent of exhibit (including fine crystal chandelier in Art Gallery).
2. Neatness of finish.
3. Excellence of lap-welded joints and key fittings.
4. General excellence of workmanship.

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98. Providence Gas Burner Co., Providence, R. I., U. S.

GAS BURNERS, DROP-LIGHT SOCKETS, AND GAS HEATERS.

Report.—Commended for the following reasons:

1. Very large and varied exhibit of gas burners.
2. An ingenious improvement in check burners.
3. An improved heating burner.
4. An improved drop-light socket.
5. Thorough workmanship and finish.

99. **George D. Rollins, Philadelphia, Pa., U. S.**

THE TRIUMPH AUTOMATIC GAS BURNER.

Report.—The design of this burner is to regulate at a certain height the flow of gas under high pressures, principally on street lamps, any increase of force in the "mains" partially closing the burner. Commended for the following reasons:

1. It is simple.
2. Automatic.
3. Cheap and economical in use.
4. It is efficient.

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100. **Bradley & Hubbard Manufacturing Co., West Meriden, Conn., and New York, N. Y., U. S.**

GAS AND OIL FIXTURES, AND LAMPS.

Report.—Commended for the following reasons:

1. Remarkably good finish and tasteful design in iron fixtures.
2. Special devices for safety in attaching kerosene lamps.
3. Superior device for raising and lowering fixtures.
4. Fine exhibit of table (oil) lamps.

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101. **Archer & Pancoast Manufacturing Co., New York, N. Y., U. S.**

GAS FIXTURES AND CHURCH METAL WORK.

Report.—Commended for the following reasons:

1. Novelty and excellence of design in centre slide light, securing regularity and certainty of movement. An invention of considerable value.
2. Beauty of frost-work finish on brass fixtures.
3. Good exhibit of colored ecclesiastical fixtures.

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102. **Mitchell, Vance, & Co., New York, N. Y., U. S.**

GAS FIXTURES AND ECCLESIASTICAL WARE.

Report.—Commended for the following reasons:

1. This exhibit is of a large, complete, and varied character, of special excellence in design, workmanship, and finish, and is arranged with great taste and skill.

2. In gilt and polished brass gas fixtures the exhibit is of excellence in the wide variety of designs employed, its elegance and artistic character, and the high order of finish attained. In combinations of metal with porcelain or glass, rich effects have been here produced.

3. In steel-finished fixtures a novelty of beauty and durability is presented.

4. The "double slide" extension light presents certain features of durability and regularity of motion that are of merit, while the arrangements for avoiding the heating and smoking of the rest of the chandelier are unique.

5. In bronze fixtures, both real and spelter, this exhibit is of excellence, as well in workmanship and finish as in chaste character and tastefulness of design.

6. In crystal gas fixtures the size of the integral parts, the integrity of the character of the goods as "crystal" (few wires or chains being used, the arms, etc., being solid crystal), the beauty and taste as well as novelty of the designs employed, and the excellence of the material used, give this part of the exhibit prominence and value.

7. In ecclesiastical ware, altar and sanctuary lights, candlesticks, coronas, chancel rails, etc., the several exhibits of the medieval and Gothic orders are of high merit.

The bronze and brass railings for church use are of excellence and beauty, being architecturally correct in their respective schools.

103. Baker, Arnold, & Co., Philadelphia, Pa., U. S.

GAS FIXTURES.

Report.—1. A line of brass gas fixtures of novelty, superior design, and subdued finish. The modified "toning" of color is a marked improvement for these wares.

2. They exhibit fine specimens of wheel burnishing on fixtures.

3. They offer unique patterns in gas stands (in the "toning" of color).

4. Extra fine work in platinum-finished gas fixtures.

5. They exhibit Meigs's solar water light, for intensifying and directing light to given points; a valuable agent for use in conveying light in magazines and unlighted closets.

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104. Dreer, Smith, & Dreer, Philadelphia, Pa., U. S.

BERFORD GAS SUNLIGHT APPARATUS.

Report.—This apparatus, which consists of a glass bowl attached to an ordinary ceiling gas fixture (being filled with water), and a gas jet extending over the centre of the bowl, casts a soft light upon objects beneath, thereby affording a cheap, safe, and simple substitute for the ordinary drop light.

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105. Mt. Washington Glass Co., New Bedford, Mass., U. S.

CRYSTAL CHANDELIERS, OPAL LIGHTS, GLOBES, AND SHADES, AND DECORATED OPAL CHANDELIERS.

Report.—Crystal chandeliers.

1. An excellent exhibit of crystal goods.

2. Strength, symmetry, and thoroughness of fitting, the entire chandelier being constructed by this house.

3. A novelty consisting of a centre slide light for crystal dining-room chandelier.

Decorated opal chandelier. Of unique and beautiful design, workmanship, and finish.

Opal shades. 1. These are of purity and free from flinty substance.

2. The large size of opal goods.

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106. Smith Brothers, New Bedford, Mass., U. S.

DECORATED GLASS SHADES AND GLOBES.

Report.—Commended for the following reasons:

1. Strength, brilliancy, and richness of decoration.

2. In gold finish, and especially in dead gold, excellent work.

3. The base and overlaid work excellent, and the artistic work uniformly of excellent quality.

4. Toughness of material, evenness of preparation, and finish.

5. Cost of goods moderate.

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107. Wm. B. Hazzard, Philadelphia, Pa., U. S.

SKYLIGHT SHADE.

Report.—It can be adjusted at once to the place required for photographic uses.

---

108. August Wilhelm, Philadelphia, Pa., U. S.

CEILING REFLECTOR.

Report.—Commended for the following reasons:

1. It is of original construction.

2. By placing the lights between the varied-angled reflecting surfaces, the illuminating power is secured.

3. By the arrangement of the angles of reflection the dazzling effect of some forms of reflector is avoided.

4. The readiness with which the reflector can be removed, cleansed, and replaced is a special advantage.

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109. American Calcium Light Co., Philadelphia, Pa., U. S.

IMPROVED CALCIUM LIGHT APPARATUS.

Report.—It is well made and finished, burns without hissing, and gives a strong, steady, intense light.

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110. American Reflector Co., Philadelphia, Pa., U. S.

METALLIC REFLECTORS.

Report.—This reflector is of superior construction, nicety of adjustment, and evident durability. Being metallic, its surfaces are capable of receiving the highest polish, renewable at pleasure.

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111. Gen. M. C. Meigs, U. S. A., Washington, D. C., U. S.

HYDRO-DIOPTIC LIGHT.

Report.—Commended for the following reasons:

1. This is a combination of a supplementary bracket, adapted to be mounted on an ordinary gas burner, a hollow lens mounted on a supplementary bracket and adapted to contain transparent liquids, and a burner also mounted on said bracket.

2. The supplementary bracket provided with a socket adapted to fit on an ordinary gas burner; a support for a dioptic lens, and a burner adjustable both vertically and horizontally.

3. An admirable invention.

---

112. Edward Miller & Co., Meriden, Conn., U. S.

LAMPS AND LAMP TRIMMINGS.

Report.—Lamps commended for the following reasons:

1. Variety, taste, and good finish noticeable in the entire exhibit.

2. The "non-explosive lamp" of this exhibit is believed to be well adapted for securing safety, brilliant light, and perfect combustion.

Lamp trimmings of good material and workmanship.

Lanterns commended for the following reasons:

1. Strength and good workmanship throughout.

2. The "No-Chimney Burner" is a special advantage in lanterns.

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113. Globe Gas-Light Co., Philadelphia, Pa., U. S.

SELF GAS-MAKING STREET LAMPS.

Report.—This is a street lamp in which naphtha, being suspended in a reservoir on the outside of the lamp near its top, is allowed to flow to a burner within; this is so constructed as to allow the burning of a small amount of alcohol when the lamp is lit, to volatilize the naphtha in the tube. Gas is generated, and continues to be, as long as the supply in the reservoir lasts.

Commended for the following reasons:

1. It affords an effective gas-light for places where gas is not manufactured.

2. It is of small expense.

3. When properly cared for, it is cleanly and safe.

114. William G. Creamer & Co., New York, N. Y., U. S.

CAR LAMPS.

Report.—Commended for the following reasons:

1. Superiority of design and finish, and novel adjustments for safety and convenience.
2. Cheapness in price and economy in use.

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115. C. F. A. Hinrichs, New York, N. Y., U. S.

GERMAN STUDENT LAMPS.

Report.—Commended for the following reasons:

1. This lamp furnishes a safe, steady, and brilliant light, without smell or smoke.
2. It is easily regulated, and may be filled without danger while burning.
3. It is of graceful form and good workmanship and finish.
4. It is economical in use.

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116. C. L. Heywood & J. M. Bruce, Boston, Mass., U. S.

VESPER-ELEVATING STREET-LAMP POST.

Report.—Commended for the following reasons:

1. The post, being hollow, by a chain-and-pulley attachment allows the lamp, which is suspended from its top, to be lowered, cleaned, filled, or extinguished with facility.
2. It works very easily.
3. It is attractive.
4. In towns where gas is unavailable it must prove a useful arrangement.

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117. Hitchcock Lamp Co., Watertown, Jefferson County, N. Y., U. S.

A MECHANICAL LAMP FOR BURNING HEAVY OILS.

Report.—This is a most ingenious invention, whereby, by means of the finest mechanism uniting a pump and a blower, the highest illuminating results are obtained.

Commended for the following reasons:

1. The device, without being complex, is most wonderfully ingenious.
2. The workmanship is of the highest possible character throughout.
3. The mechanism is practically indestructible by wear or ill usage.
4. It has no chimney, and emits no smoke, gas, or odor.
5. It is compact, symmetrical, and perfectly sealed against the intrusion of foreign matter.
6. It can be filled while burning.
7. Sediment cannot accumulate in the oil tank, as it is delivered with the oil to the flame and there burned.
8. The quantity of light is not diminished by oscillation, jarring, or removal from place to place.
9. By photometric test we find it to operate most effectively at seventeen-candle power; it will undoubtedly maintain fifteen-candle power for nearly twelve hours.
10. Both in original cost and daily use it is undoubtedly a gain in economy in lamp service of its character.
11. The tenacity of the flame is very superior, it being very difficult to extinguish except in the regular way.
12. Its air passages are kept clear by the overflow of the surplus of oil, which is delivered to the flame and flows back into the tank.
13. For railway use especially, ships' use, and all places requiring a powerful lamp at small cost, this must prove an advantage of the greatest value.

118. J. W. Bartlett, New York, N. Y., U. S.

IMPROVED STREET LAMPS.

Report.—Commended for the following reasons:

1. They are correctly-reflecting street lamps.
2. They diffuse the light.
3. Their shape offers graceful proportions, with great powers of resisting breakage.
4. They are easily cleaned.
5. They are economical.
6. The arrangement for the attachment of street names is convenient.
7. They are of thorough workmanship throughout.

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119. Keen & Hagerty, Baltimore, Md., U. S.

HAGERTY'S PATENT STREET LAMPS.

Report.—Commended for the following reasons:

1. They are simple in construction.
2. They diffuse the light readily.
3. By the hinge top the removal of the globe for cleansing is made remarkably easy
4. They are of general good workmanship and strength.

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120. Williams, Page, & Co., Boston, Mass., U. S.

RAILWAY AND STEAMSHIP LAMPS.

Report.—Car lamps. They have special adjustment for safety, cleanliness, and for preventing the dropping of oil. They are simple, strong, and ornamental. All springs are clamped, thereby preventing rattling.

Postal-car lamp. This lamp is so arranged as to prevent shadows falling upon the work.

Steamship lamps. Improved globe chimney, non-shadow lamp for chart room; an improvement of value and utility.

Hurricane lamps. A superior "double current" lamp, that cannot be blown out.

Commended for general excellence in workmanship and finish.

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121. Excelsior Lantern Co., New York, N. Y., U. S.

LANTERNS.

Report.—Commended for the following reasons:

1. A large and varied exhibit of ship, railroad, and hand lanterns, of good design, strength, and finish.

2. Special devices of convenience and safety in ship, railroad, and hand lanterns.

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122. Wilhelm & Neumann, Philadelphia, Pa., U. S.

POST LANTERNS AND SILVERED MICA REFLECTORS.

Report.—Post lanterns. Commended for the following reasons:

1. Large variety (twenty-four styles), and superiority of design and workmanship.

2. The sectional globes of this exhibit, permitting the renewal of a broken section without the removal of the whole globe, are an improvement of decided merit.

Silvered mica reflectors. These are of great durability and of excellent reflective power.

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123. Walton Brothers, New York, N. Y., U. S.

LANTERNS.

Report.—The exhibit of lanterns made by this house is varied in character, and in all its departments evinces superior workmanship, marked originality in design, good finish,

and in ship and railway lanterns considerable novelty and ingenuity of adaptation. In nickel-finished goods their exhibit is good, and the extra attention paid to strength and security in their "mining" and "magazine" lanterns is evident. Their novelties in pocket and hand lanterns, with and without reflectors, are each excellent in their line.

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124. Holmes, Booth, & Haydens, Waterbury, Conn., U. S.

KEROSENE OIL BURNERS AND GAS FIXTURES.

Report.—A very large exhibit, of wide variety, showing superior workmanship, strength, and durability, novelty of design, special excellence in gas tubings, and very superior material.

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125. F. H. Lovell & Co., New York, N. Y., U. S.

DRUMMOND KEROSENE BURNER.

Report.—Commended for the following reasons:

1. Simplicity of construction.
2. Improvement in contour of wick, it being convex in shape.
3. Regularity in ratchet movement.
4. Ingenious device for free circulation of air, coupled with protection against heating of oil.
5. Improvement in shape and toughness of chimney.

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126. Cleveland Non-Explosive Lamp Co., Cleveland, Ohio, U. S.

GENERAL KEROSENE GOODS, METALLIC SAFETY LAMPS, AND NICKEL PLATING.

Report.—The non-explosive lamp is,—

1. Safe.
2. The escape of its vapor to the flame is provided for.
3. Its arrangements for a supply of air to the wick secure complete combustion.
4. It has new devices for cleanliness.
5. It may be filled with safety while burning.
6. It is odorless.

The nickel finish of these goods is of high character, and the workmanship good.

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127. H. H. Doty, Norfolk, Va., U. S.

ARGAND AND TRIANGULAR KEROSENE BURNERS.

Report.—Commended for the following reasons:

1. These burners are arranged on a decidedly improved plan for securing perfect combustion of the oil.
2. As a result, the burning is without offensive odor.
3. The degree of brilliancy and whiteness attained is extreme, as also that of steadiness.
4. The arrangement of air-flues, wicks, and chimneys are convenient, and render practicable the use of petroleum oils by light-house and other services.
5. The workmanship and fitting throughout are of thorough description.

A strong point is its economy.

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128. J. Gardner & Sons, London, England.

LAMPS AND CANDLESTICKS.

Report.—Commended for the following reasons:

1. Richness of finish in house-lamps in frosted and repoussé silver, nickel, and brass.
2. Students' lamps of various devices and unusual cheapness.

3. Remarkable ingenuity of device and construction in an arctic lamp, effectually arranged to prevent congelation of the oil.

Candlesticks. Commended for—1. Novel patterns of candlesticks with chimneys to prevent their being blown out, the air being supplied from the bottom. 2. Elegance of design and extreme beauty of workmanship in silver candlesticks.

Copper lanterns. Commended for good finish and design.

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129. James Green & Nephew, London, England.

CRYSTAL CHANDELIERS AND WALL CANDELABRA.

Report.—Commended for the following reasons:

1. This exhibit is of the highest degree of excellence in its class. The character of the material, the beauty of design, and thoroughness of construction, are quite unrivaled.

2. In wall and stand candelabra and wall-lights for gas or candles, the brilliancy, whiteness, and purity of the glass are especially worthy of recognition.

3. The finish of the setting is believed to be of more than ordinary durability.

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130. John McIlwraith, Melbourne, Victoria, Australia.

TINNED COMPOSITION GAS-PIPE.

Report.—It is of excellent construction (hydraulic pressed) and of apparent durability.

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131. Modeste Kittary, St. Petersburg, Russia.

PETROLEUM LAMP FOR HOSPITAL USE.

Report.—It is ingeniously adapted for use on the wall or ceiling, burning for twelve hours, and affording an equable light.

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132. Charles Robinot, Paris, France.

GAS FIXTURES AND GAS FURNACES.

Report.—Commended for a good general exhibit, of fair workmanship and finish, with some novelty of design.

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133. Muller & Co., Clermont, near Liége, Belgium.

WICKS OF SAFETY FOR MINERS.

Report.—Commended for the cheapness of these products and their superior quality.

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134. Bronze-Ware and Tin-Castings Manufacturing Co., Berlin, Germany.

GAS LUSTRES AND GAS CANDELABRA.

Report.—Commended for variety, richness of design, and superior workmanship.

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135. C. A. Kleeman, Erfurt, Germany.

LAMPS AND LAMP FIXTURES.

Report.—General exhibit of lamps and lamp fixtures of good character, style, and variety. The bracket, postal-car, and ship lamps, with lock fonts for burning heavy oils, are of marked merit. The drop-lamp (on the Penobscot Indian device), being held the firmer the harder pulled, is a novelty in its way.

German student lamp. In this the double draught-flues secure complete combustion, the wick being movable on the screw plan. It has a lock font, preventing the spilling of oil when the lamp is upset. No removal of shade or chimney necessary to light the lamp. Commended for thoroughness of workmanship and elegance of finish.

136. **I. von Schwarz, Nuremberg, Germany.**

SOAPSTONE GAS-BURNERS, ARGAND, AND COOKING BURNERS.

Report.—Commended for exactness and excellence of workmanship, and quality of material used.

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137. **Edward Wattis, Jr., Philadelphia, Pa., U. S.**

WATTIS' PATENT POCKET-FLASK.

Report.—The bottle has square sides, and about a half-inch from the top of the neck a groove is made around the neck of the bottle. The metal screw collar is cast with squares to fit the neck of the bottle, which prevents the metal from turning. The bottle is then put on a lathe, held to a chuck at one end, and properly supported at the other end with a suitable shape. The metal of the collar is forced into the groove by the contact of the tool under the speed-off, and when the metal cap with its cork lining is screwed down, the cork is brought in close contact with the top of the glass neck, thereby making it perfectly air-tight, preserving the flavor and purity of its contents for any length of time.

It is unquestionably the best process extant for securing the metal collars to the neck of bottles without the aid of any cement or any adhesive.

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138. **Ella G. Haller, New York, N. Y., U. S.**

RESERVOIR FRUIT JAR.

Report.—The object of the covering or top reservoir is to supply the syrup as fast as it becomes absorbed by the fruit, so that the jar may be always full, and the contents fully covered, thus protecting them from mould, decay, and discoloration.

This cover has a natural atmospheric pressure joint, but has fastenings also added to render it doubly secure.

Has three different and distinct joints.

It (the cover or reservoir) is of blown glass, thus doing away with use of metal wire rings, springs, and extra fastenings of every sort, which add greatly to the cost of the jars.

It is the only jar that covers the fruit with extra syrup by a mode at once simple and effective.

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139. **Duncan Cameron, New York, N. Y., U. S.**

STEAM FRUIT PRESERVERS.

Report.—It presents an expeditious method of cooking fruit ready for sealing, in a remarkably short time, with or without sugar, preserving natural flavor and color for an indefinite period.

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140. **B. F. Sturtevant, Boston, Mass., U. S.**

MACHINE FOR DRYING LUMBER AND OTHER MATERIALS.

Report.—Commended for the following reasons:

1. Its less first cost than an effective amount of steam pipe as usually arranged, its compactness, convenience of erection, capability of regulating the quality and quantity of heat, its less loss from radiation, its less liability to leakage and consequent damage to goods.

2. Its adaptation to hospitals, prisons, and public buildings, not only for heating, but ventilation, under all conditions, allowing the air itself, before its introduction into the rooms, to be saturated with moisture or disinfectants.

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141. **Stuart, Peterson, & Co., Philadelphia, Pa., U. S.**

TINNED AND ENAMELED CAST-IRON HOLLOW WARE.

Report.—Commended for the following reasons:

1. Size, finish, form, and durability.
2. Superior material and workmanship.
3. Free from metallic oxides, and therefore adapted to chemical and culinary use.

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142. The Keller Manufacturing Co., Harrisburg, Pa., U. S.

GRADUATED STANDARD QUART MEASURE.

Report.—Commended for the following reasons:

1. Its formation from one piece of sheet metal, gauged inside, and graduated with small offsets.
2. The precision of the graduation, and its accordance with the United States standard.
3. From its inverted cone shape it is easy to note the amount of liquid when filling, and very easily cleansed.
4. Its neatness, simplicity, and practical usefulness.

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143. Tatham & Brothers, New York, N. Y., and Philadelphia, Pa., U. S.

TIN-LINED IRON PIPE; TIN-LINED LEAD PIPE; BLOCK-TIN PIPE.

Report.—Commended for the following reasons:

1. Merit consists of the combination of the cleanliness and purity of tin with the strength of iron, thus making a strong, durable, and cleanly pipe for the conveyance of water.
2. The accomplishment of a secure and perfect joint, without solder, neither air nor water by any possibility entering between the tin and the iron.
3. Superior roundness and solidity, smooth polish, and uniformity of size.

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144. Corrugated Elbow Co., New York, N. Y., U. S.

CORRUGATED SHEET METAL ELBOWS.

Report.—Commended for the following reasons:

1. The manufacture of the elbows is in perfect circular form, from one piece of metal, thus avoiding seam or joint, the corrugations adding to its strength and beauty.
2. The freedom of draught the curve affords over the sharp angle of ordinary elbows and the prevention of any accumulation of soot or other débris.
3. Its economy.

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145. Charles F. Henis, Philadelphia, Pa., U. S.

ADJUSTABLE ELBOW FOR STOVE OR HEATER.

Report.—Commended for the following reasons:

1. A pipe constructed in sections, upon the radius of the circle in which the elbow is curved, and making the sections alternately solid and open, the open sections being so constructed as to clamp together the solid ones, which are held firmly in any desired position by adjustable clamps.
2. Its adjustability, and rigidity after adjustment.
3. Its simplicity.
4. It gives a curved instead of angular passage for the air draught.
5. Cost of production trifling.

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146. Ernest W. Bowditch, Boston, Mass., U. S.

PLANS FOR RURAL PARKS FOR BOSTON, ETC.

Report.—These plans exhibit a rare degree of skill in dealing with the matter here under consideration.

The scope of the plans and their execution are of marked merit.

147. Williams & Co., Nashua, N. H., U. S.

SOAPSTONE GOODS, INCLUDING STOVES, SINKS, WASH-TRAYS, ETC.

Report.—Commended for beauty of design, excellence of material and workmanship, softness and beauty of color, cleanliness, freedom from disagreeable odor, its strength and non-liability to crack or leak, its superior sanitary quality as compared with its passage through iron.

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148. John Danks, Melbourne, Victoria, Australia.

STEAM VALVES, COCKS, VALVES, SUET LUBRICATORS, INJECTORS, SLUICE VALVES, GENERAL BRASS FOUNDRY.

Report.—Commended for variety of patterns, purity of metal, and excellent mechanical skill and workmanship.

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149. J. Hyde Fisher, Chicago, Ill., U. S.

REFRIGERATORS.

Report.—Commended for a large assortment of different sizes of refrigerators, made strong and on a principle that will secure a satisfactory result. The frame is made double, of wood with intervening space according to size of the machine, which is filled with pulverized charcoal. Above the provision rooms is the ice chamber, which is made larger than usual in order that it may be filled with ice, and, as waste occurs, kept filled up. The larger the supply the less the waste. The principle of ventilation consists in each chamber having separate flues for warm and cold air. The former are placed at the top of the provision rooms, running back and entering the ice chamber at the top. The cold air from the ice chamber passes into the provision rooms under the point where the warm air escapes. In this way a current is established, the ice itself being the purifier. The water-pipe from the ice chamber is placed in the partition dividing the two provision rooms.

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150. Penn Galvanic Works (F. & P. F. Chase), Philadelphia, Pa., U. S.

GALVANIZED KITCHEN GOODS OF ALL DESCRIPTIONS.

Report.—1. Superiority of castings—no crevices—uncovered.

2. The absence of tin, generally resorted to as a casting.

3. Excellent designs and superior workmanship.

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151. J. Reynolds & Son, Philadelphia, Pa., U. S.

SHAKING AND CLINKER-CUTTING GRATE.

Report.—Commended as well adapted for removing the superfluous ashes from the fuel of a furnace or fire-pot, and for crushing the clinkers, stone, and other obstructions that accumulate on the grate. It consists of a frame in which is placed a series of rocking shafts or axles on which are cast or attached a number of projecting interlocking teeth or cutters, having ribs on their sides; the rocking bars are connected underneath by a bar, and operated by a lever, any movement of which causes the teeth on one shaft to rise, while those on the adjoining shaft descend and pass between the rising ones. This operation takes place throughout the entire grate. Any cinders or clinkers caught between the teeth are disintegrated by the ribs as the teeth approach each other, and fall into the ash-pit below. As the teeth on one side of the shaft are elevated, and the adjoining teeth on the adjacent shaft depressed, the points of the teeth fill up the intervening space, so no fuel can fall through at these points. The grate-frame is supported on rollers, so as to be easily drawn out for dumping the contents of fire-pot, or renewal or repairs. Novel and efficient.

152. J. Reynolds & Son, Philadelphia, Pa., U. S.

WROUGHT-IRON AIR-TIGHT FURNACE FOR ANTHRACITE AND BITUMINOUS COAL.

Report.—1. Its provisions for radiation of heat, and complete combustion of fuel without smoke or gas, and insuring a constant supply of pure moistened air, are of a superior order.

2. It is offered at a low price, and its plan is such as to secure economy in fuel and unusually good results in much heat from small fire.

3. It is evidently planned for durability.

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153. A. G. Myers, New York, N. Y., U. S.

IMPROVED WATER-CLOSET AND WASH-BASIN.

Report.—Water-closet. The improvement of a solid plunger we consider one of the highest order, securing, as it does, both durability and security from gas, as well as establishing a perfect "seat." The "overflow" is here rendered perfect, and all possibility of sewer-gas emanation is effectually precluded, while greatest certainty is given to the "flushing" process.

Waring's improved wash-basin. The new device of stopping the basin from below, and the simultaneous filling of both overflow- and supply-pipes with water, thereby cutting off the possible entrance of sewer-gas, are improvements of a high order, while in point of convenience the basin is entirely unique.

SIGNING JUDGES OF GROUP XIV.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

CHRISTOPHER C. COX, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 78, 79, 81, 82, 84, 85, 87, 88, 89, 92, 111, 133, 134, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 147, 148, 151, 152, 153.

AZEL AMES, JR., 43, 77, 80, 83, 86, 90, 91, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 135, 146, 149, 150.

SUPPLEMENT TO GROUP XIV.

REPORTS

OF

JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.
COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

1. Abendroth Brothers, New York, N. Y., U. S.

STOVES AND RANGES.

Report.—The "Fireside" pattern, 1875. Commended for convenience of arrangement, good disposition of flues and radiating surfaces, fitness for either hard or soft coal.

The ranges are well made, easily cleaned of dust in flues, and not liable to get out of order.

2. A. Hess, Philadelphia, Pa., U. S.

THE "MODEL BAKER."

Report.—Commended for convenience and general fitness for its intended use.

3. Florence Sewing Machine Co., Florence, Mass., U. S.

FLORENCE OIL STOVE.

Report.—It is simple in construction, easily managed, and well adapted to its intended purpose. The heated-air circulation is good.

4. T. J. Whitehead, South Paris, Me., U. S.

COMBINED COOKING AND HOT-AIR FURNACE.

Report.—Commended for portability and general fitness for its intended purpose. Workmanship good.

5. Barstow Stove Co., Providence, R. I., U. S.

RANGES AND FURNACE.

Report.—Stoves, ranges, and furnaces well designed and conveniently arranged; well adapted to their intended use. Castings of superior quality.

6. Reid & Cooper, Elmira, N. Y., U. S.

THE "ON TIME" COOK STOVE.

Report.—Casting good, workmanship excellent, arrangement of the stove convenient and effective.

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7. C. O. Westland, Troy, N. Y., U. S.

PARLOR STOVE.

Report.—Good arrangement of base-burning stove in respect to flues and radiating surfaces.

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8. David Boyd, New York, N. Y., U. S.

FLUE RADIATOR; FLUE AND DIAPHRAGM ATTACHMENT.

Report.—Commended for convenience of attachment for utilizing waste heat from stoves, and fitness for purpose intended.

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9. National Stove Works, New York, N. Y., U. S.

HEATERS, RANGES, AND STOVES.

Report.—Heaters, ranges, and stoves well made and well arranged to accomplish their intended purpose. The facility afforded for cleaning the lower part of the fire by the opening at bottom of grate is good.

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10. New Haven Steam Heating Co., New Haven, Conn., U. S.

RADIATORS AND SCREENS FOR LOW-PRESSURE STEAM HEATERS.

Report.—Well adapted to give off heat from low steam; neat and well made.

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11. John Q. Birkey & Co., Philadelphia, Pa., U. S.

GAS HEATERS.

Report.—Commended for thorough combustion of gas, freedom from unpleasant smell while in operation, and for very good heating qualities. Workmanship good.

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12. William Miller, Cincinnati, Ohio, U. S.

RANGES.

Report.—Portable wrought-iron cooking range of good design and finish, and well arranged. Superior workmanship.

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13. W. H. Harrison & Brother, Philadelphia, Pa., U. S.

GRATES AND FIRE-PLACES.

Report.—The low-down grates and ornamental fire-places are of very fine workmanship, good material, and exceedingly artistic design. The fire-place for wood or coal, with portable grate resting on fire-dogs, is especially worthy of notice.

Fire grate with fender arranged to raise like a blind, adjustable to any height, and serving as a summer screen, is very commendable.

The whole exhibit shows a high order of artistic merit.

14. **Geo. R. Barker, Germantown, Philadelphia, Pa., U. S.**

COMBINED HEATING AND VENTILATING FLUE APPARATUS AND DOUBLE REGISTER.

Report.—The arrangement of hot-air register in connection with and over the register for the escape of the cool air from the room fulfills the condition of effective low-down ventilation, insuring a thorough circulation in the apartment.

It is convenient in adjustment, and admirably fitted to accomplish its intended use.

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15. **Weaver & Pennock, Philadelphia, Pa., U. S.**

MARBLE LAVATORY.

Report.—Commended for good workmanship, convenient arrangement, and beauty of exhibit.

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16. **Consolidated Fruit Jar Co., New Brunswick, N. J., U. S.**

FRUIT JARS.

Report.—Of excellence for ingenuity of device and thoroughness of construction and workmanship.

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17. **M. W. Gardner, Troy, N. Y., U. S.**

COMBINATION KNOBS FOR STOVES, RANGES, ETC.

Report.—A good exhibit of articles well adapted for the purpose intended.

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18. **E. F. Phillips, Providence, R. I., U. S.**

FLEXIBLE GAS TUBING.

Report.—Its distinguished characteristic is a wire centre core surrounded with two or more seamless layers of animal intestines treated with softening material; finish of tubing good.

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19. **Chalfant Manufacturing Co., Philadelphia, Pa., U. S.**

MRS. POTT'S PATENT COLD-HANDLED SADIRON.

Report.—They are of good shape, and, being filled with non-conducting material, will retain heat well. The handle is detachable, and, being of wood, will not convey heat to the hand. They are convenient and well adapted for the purpose intended.

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20. **Henry Steeger, New York, N. Y., U. S.**

COPPER BOILERS AND BATH TUBS.

Report.—Circulating boilers of copper, superior in workmanship and finish.

Bath tubs well made, of good shape, and of good material.

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21. **John P. Schaum, Lancaster, Pa., U. S.**

COPPER KETTLES AND COPPER-WARE (HAND-MADE).

Report.—Commended for superior workmanship.

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22. **Joseph Scheider & Co., Portland, Conn., U. S.**

STAMPED AND JAPANNED WARE; HOUSEHOLD FURNISHING GOODS.

Report.—1. Japanned ware of superior workmanship, good design and finish.

2. Stamped tin-ware of superior workmanship and very good shapes.

23. Wilson Manufacturing Co., Philadelphia, Pa., U. S.

CLOTHES RACK, STOVE-PIPE CLOTHES DRIER, AND NURSERY CUP.

Report.—The clothes rack for wall, and rack surrounding a stove-pipe, is ingeniously contrived, simple, and useful.

The "one-minute nursery cup" is well adapted for the purpose intended.

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24. Mrs. S. P. Ball, Frankford, Philadelphia, Pa., U. S.

SELF-HEATING GAS SMOOTHING IRON.

Report.—This smoothing iron is heated by jets of gas from a pipe within its body, the jets escaping downward toward the part of the iron in contact with the goods to be ironed, and to the gas-jets air is freely admitted through the sides of the iron, which are formed of wire gauze. Commended for convenience and fitness for its intended use.

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25. J. W. Ruger, Buffalo, N. Y., U. S.

CRACKER, BREAD, AND CAKE MACHINERY, AND BAKERS' TOOLS.

Report.—1. Cracker-cutting machine. Commended for ingenuity and fitness for its intended use.

2. Steamer and marker. Intended to give a good appearance to snaps, crackers, and cakes. Well made and convenient.

3. Snap machine. Well designed to accomplish its intended use.

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26. Alexander M. Lesley, New York, N. Y., U. S.

THE "ZERO" MILK, WINE, AND WATER COOLER.

Report.—Commended for convenience of arrangement of parts, portability, and adaptation to its intended use.

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27. Gem Soldering-Iron Manufacturing Co., Philadelphia, Pa., U. S.

GEM SOLDERING-CASKET.

Report.—It is an exceedingly convenient set of tools for home use in repairing tins.

The soldering-iron is heated by gas passing through the handle from an ordinary gas-burner, over which it is placed to be heated. Effective and convenient.

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28. E. Ketcham & Co., New York, N. Y., U. S.

TIN-WARES AND KITCHEN GOODS.

Report.—Commended for great variety, good workmanship and design.

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29. Walworth Manufacturing Co., Boston, Mass., U. S.

GAS MACHINES.

Report.—Commended for excellence in construction.

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30. Dorlan & Anderson, Philadelphia, Pa., U. S.

PLUMBING AND GAS-FITTING DONE IN MEMORIAL HALL.

Report.—Commended for good workmanship.

31. **New York Lamp Co., New York, N. Y., U. S.**

CAR AND STEAMSHIP LAMPS.

Report.—The method of raising the globe and chimney on guides for the purpose of lighting and cleaning recommends it for use on cars and steamships. Commended for good design and workmanship.

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32. **J. Bradley & Co., Philadelphia, Pa., U. S.**

THE NATIONAL ODORLESS EXCAVATING APPARATUS.

Report.—Commended for convenience and adaptation to its intended use.

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33. **Jos. L. Travis, Philadelphia, Pa., U. S.**

NE PLUS ULTRA WATER-CLOSETS.

Report.—Commended for general arrangement of water-closet, permitting easy adjustment of parts, simplicity and efficiency of the valve, general fitness for use intended, and good workmanship.

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34. **The Allegretti Refrigerator Co., New York, N. Y., U. S.**

REFRIGERATORS.

Report.—Commended for utility and fitness, as illustrated in its continued use in the Government Building.

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35. **Carl Vignal, New York, N. Y., U. S.**

ICE-CREAM REFRIGERATORS.

Report.—Commended for convenience of arrangement and utility in keeping ice-cream in stock.

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36. **John Gravenstine, Philadelphia, Pa., U. S.**

REFRIGERATOR.

Report.—The arrangement of the "circulating box," directing the currents of air, keeps up a circulation of air within the closet. Commended for convenience of arrangement and fitness for its intended use.

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37. **Geo. A. Banta, New York, N. Y., U. S.**

LARGE REFRIGERATOR IN GOVERNMENT BUILDING.

Report.—Commended for successful operation of this refrigerator in keeping fish in a perfect condition during the summer. The arrangement of drawers for removing special deposits from the case is very good. Well designed to accomplish its intended purpose.

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38. **Colin Pullinger, Selsy, near Chichester, England.**

SIFTERS, CASK STANDS, AND MOUSE TRAPS.

Report.—Commended for a curious collection of very ingenious contrivances covering a wide range of objects, showing very considerable inventive skill and good workmanship.

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39. **Doulton & Co., Lambeth Pottery, London, S. E., England.**

PLUMBAGO CRUCIBLES.

Report.—Commended for quality, finish, and variety of product adapted to the demands of the trade using them.

40. **Steel & Garland, Wharncliffe Works, Sheffield, England.**

STEEL GRATES AND FENDERS WITH ENCAUSTIC TILES.

Report.—The exhibit of this house shows superior workmanship and design. Their projecting grate is well calculated to give a good result in heating.

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41. **João Thome Alcobia, Lisbon, Portugal.**

KITCHEN AND PANTRY UTENSILS AND PORTABLE BATH TUBS.

Report.—This is a creditable exhibit of tin-ware, painted and decorated. Shapes good; workmanship excellent.

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42. **Costa Basto & Co., Foundry of Bolhão, Oporto, Portugal.**

STOVE, IRON POTS AND KETTLES.

Report.—1. Stove. Commended for fair castings and well-arranged system of doors above grate with good fastenings.

2. Cast-iron hollow ware. Good forms, smooth castings, and well tinned.

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43. **W. J. Sommerschuh, Prague, Austria.**

EARTHENWARE STOVE AND SLABS.

Report.—The earthenware stove is commended for good workmanship and design.

SIGNING JUDGES OF SUPPLEMENT TO GROUP XIV.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

COLEMAN SELLERS, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43.

HENRY H. SMITH, 16.

CHARLES STAPLES, JR., 29.

